CHAPTER 31

INSTRUMENTS

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1. Table of Contents Microfilm -- Instructions For Use

   A. This microfilm contains the Table of Contents (TOC), and maintenance manual information for all DC-8 60 Series aircraft customers except Air Canada whose TOC reflects a combined 50/60 Series Maintenance Manual. For information on a specific aircraft, refer to TOC for the owner or lessee of that aircraft.

   B. Each Table of Contents page has the Chapter, CODE, and Page number in the bottom outside corner of the page. The CODE number determines the customer; for example, CODE 1 is United Air Lines, CODE 2 Delta Air Lines and so on. The Table of Contents lists the Aircraft Identification page (if applicable), Alphabetical Index, and Chapter, Section, Subject matter with applicable aircraft CODE. Adjacent to the CODE, the aircraft effectivity is listed.

   C. Aircraft are identified on the Table of Contents either by Effectivity Code Number, Fleet Number, Registration Number, or Factory Serial Number. The Factory Serial Number is used only when the Fleet Number or Registration Number is not available.

   D. Table of Contents for all customers are listed immediately following these instructions. Where applicable, the Aircraft Identification page is inserted immediately following the TOC. This Aircraft Identification page contains the name of the customer or lessee, Manufacturing Series, Factory Serial Number, Effectivity Code or Fleet Number, and Registration Number. The Aircraft Identification page will have a customer CODE as described above.

2. DC-8 60 SERIES AIRLINE CUSTOMERS - TABLE OF CONTENTS INDEX

Customer Title	Airline Code	Table of Contents Code
United Air Lines, Inc.	UAL	1
Eastern Air Lines, Inc.	EAL	2
Swiss Air Transport Company, Ltd. Scandinavian Airlines System	SWA/SAS	3
Delta Air Lines, Inc.	DLT	4
National Airlines, Inc.	NAL	5
Braniff Airways, Inc. (was PAG)	BNF	6
Air Canada (was TCA)	AC	7
Alitalia-Linee Aeree Italiane	ALI	8
KLM-Royal Dutch Airlines	KLM	9
Trans International Airlines	TIA	10
Trans Caribbean Airways, Inc.	TRC	11
Canadian Pacific Air Lines, Ltd.	CPA	12
Saturn Airways, Inc.	STN	13
Union De Transports Aeriens	UTA	14
Japan Air Lines Co., Ltd.	JAL	15
Universal Airlines, Inc.	UNI	16
The Flying Tiger Line, Inc.	FTL	17
Capital Airways, Inc.	CAP	18
Iberia, Lineas Aereas de Espana, S.A.	IBR	19
Airlift International, Inc. (includes LYD)	ALF	20
Overseas National Airways, Inc.	ONA	21
Seaboard World Airlines, Inc.	SEA	22
Venezolana Internacional de Aviacion, S.A. (a/c included in KLM Contents)	VIA	23
Finnair-Aero O/Y	FIN	24
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AIRPLANE IDENTIFICATION

SWISS AIR TRANSPORT COMPANY LTD.

SCANDINAVIAN AIRLINES SYSTEM

Manufacturing Series	Factory Serial Number	SWA/SAS Effectivity Code	Registration Letters	Customer
DC-8-62	45905	55	SE-DBF	SAS
DC-8-62	45906	56	OY-KTD	SAS
DC-8-62	45822	57	LN-MOO	SAS
DC-8-62	45823	58	SE-DBE	SAS
DC-8-62	45921	59	SE-DBG	SAS
DC-8-62	45919	60	HB-IDE	SWA
DC-8-62	45920	61	HB-IDF	SWA
DC-8-62	45925	62	HB-IDG	SWA
DC-8-62F	45922	63	OY-KTE	SAS
DC-8-62F	45984	64	HB-IDH	SWA
DC-8-62	46077	65	HB-IDI	SWA
DC-8-62CF	46078	66	HB-IDK	SWA
DC-8-62	46134	67	HB-IDL	SWA
DC-8-62	46102	68	LN-MOG	SAS
DC-8-62CF	46129	69	SE-DBI	SAS
DC-8-63	45923	70	LN-MOU	SAS

Manufacturing Series	Factory Serial Number	SWA/SAS Effectivity Code	Registration Letters	Customer
DC-8-63	45924	71	SE-DBH	SAS
DC-8-63	46041	72	OY-KTE	SAS
DC-8-63	46054	73	LN-MOY	SAS
DC-8-63	46136	74	SE-DBK	SAS
DC-8-63	46163	75	SE-DBL	SAS
DC-8-63PF	46074	76		SWA
DC-8-62	46131	77	LN-MOW	SAS
DC-8-62AF	46150	78	LN-MOC	SAS

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AIRPLANE IDENTIFICATION

DELTA AIR LINES, INC.

Manufacturing Series	Factory Serial Number	Fleet Number	Registration Number
DC-8-61	45907	861	N822E
DC-8-61	45914	862	N823E
DC-8-61	45915	863	N824E
DC-8-61	45944	864	N825E
DC-8-61	45979	865	N826E
DC-8-61	46014	866	N1300L
DC-8-61	46018	867	N1301L
DC-8-61	46029	868	N1302L
DC-8-61	46030	869	N1303L
DC-8-61	46048	870	N1304L
DC-8-61	46072	871	N1305L
DC-8-61	46055	872	N1306L
DC-8-61	46056	873	N1307L

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AIRPLANE IDENTIFICATION

AIR CANADA

Manufacturing Series	Factory Serial Number	Fleet Number	Registration Number	Manufacturing Series	Factory Serial Number	Fleet Number	Registration Number
DC-8-40	45442	801	CF-TJA	DC-8-50	45933	820	CF-TIH
DC-8-40	45443	802	CF-TJB	DC-8-50	45934	821	CF-TII
DC-8-40	45444	803	CF-TJC	DC-8-50	45962	822	CF-TIJ
DC-8-40	45445	804	CF-TJD	DC-8-61	45890	860	CF-TJT
DC-8-40	45565	805	CF-TJE	DC-8-61	45891	861	CF-TJU
DC-8-40	45566	806	CF-TJF	DC-8-61	45892	862	CF-TJV
DC-8-40	45609	807	CF-TJG	DC-8-61	45893	863	CF-TJW
DC-8-40	45610	808	CF-TJH	DC-8-61	45963	864	CF-TJX
DC-8-40	45611	809	CF-TJI	DC-8-61	45964	865	CF-TJY
DC-8-40	45612	810	CF-TJJ	DC-8-61	45980	866	CF-TJZ
DC-8-40	45638	811	CF-TJK	DC-8-63	46033	867	CF-TIK
DC-8-50F	45640	812	CF-TJL	DC-8-63	46034	868	CF-TIL
DC-8-50F	45653	813	CF-TJM	DC-8-63	46035	869	CF-TIM
DC-8-50F	45654	814	CF-TJN	DC-8-63	46036	870	CF-TIN
DC-8-50F	45655	815	CF-TJO	DC-8-63	46076	871	CF-TIO
DC-8-50F	45679	816	CF-TJP	DC-8-63	46100	872	CF-TIP
DC-8-50F	45686	817	CF-TJQ	DC-8-63	46123	873	CF-TIQ
DC-8-50F	45860	818	CF-TJR	DC-8-63	46124	874	CF-TIR
DC-8-50F	45861	819	CF-TJS	DC-8-63	46125	875	CF-TIS

Manufacturing Series	Factory Serial Number	Fleet Number	Registration Number	Manufacturing Series	Factory Serial Number	Fleet Number	Registration Number
DC-8-63	46113	876	CF-TIU				
DC-8-63	46126	877	CF-TIV				
DC-8-63	46114	878	CF-TIW				
DC-8-63	46115	879	CF-TIX				

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GENERAL - DESCRIPTION AND OPERATION

1. Description

A. The Instruments chapter describes and illustrates the instruments and control panels that mount the instruments, switches, and indicators that are necessary for the operation of the airplane. Components that are specifically related to other systems are covered in the applicable chapter. Figure 1 shows the locations and identifies the major panels covered in this chapter.

B. Independent instruments and unrelated systems are also included in this chapter. Separate detailed coverage is provided for these components.

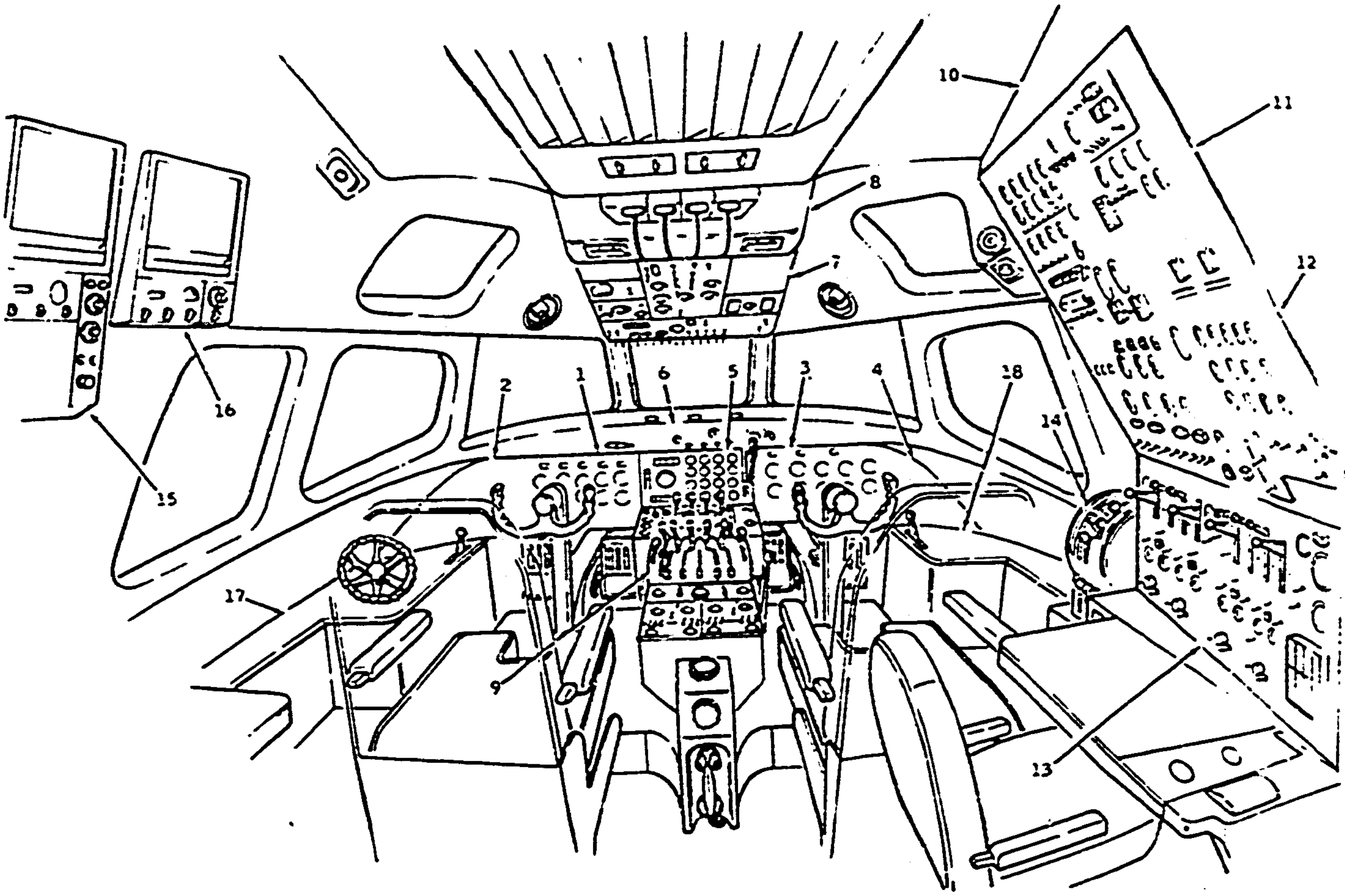
C. Maintenance consists mostly of replacement of instruments, control panels, switches, and panel components. All components are easily accessible and can be maintained without the use of special tools.

D. The general maintenance practices section of this chapter shows examples of instrument removals, control panel removals, indicator light removals, and switch removals. Separate detailed maintenance is not provided if a component requires only standard installation procedures. Precautions and safety measures, which must be observed before removal of components, are included in the general maintenance practices section.

E. Most instruments are clamp mounted. A few instruments are secured to the panel with screws. Electrical connections are made using miniature bayonet, quick-disconnect type connectors. Wiring to each instrument is of sufficient length to permit removal of the instrument from the face of the panel.

F. Some instrument panels are designed with indicators that fit into structure-mounted electrical connectors positioned behind the panel. The connectors are spring loaded and exert a constant back pressure on the panel. It is desirable to relieve this pressure by partially removing such instruments before removing the panel.

G. All flexible instrument lines and fittings are of the replaceable type. Nonkinking hose is used. Different size lines and fittings are installed to prevent inadvertent interchange of connections. The use of tees and crosses for connections to other instruments or components is minimal.



1. CAPTAIN'S FLIGHT INSTRUMENT PANEL
2. CAPTAIN'S GUSSET PANEL
3. FIRST OFFICER'S FLIGHT INSTRUMENT PANEL
4. FIRST OFFICER'S GUSSET PANEL
5. ENGINE INSTRUMENT PANEL
6. GLARESHIELD INSTRUMENT PANEL
7. OVERHEAD SWITCH PANEL
8. FIREX PANEL
9. PILOTS' CONTROL PEDESTAL
10. SYSTEMS ENGINEER'S CONTROL PANEL (UPPER FRAME)
11. SYSTEMS ENGINEER'S CONTROL PANEL (UPPER SECTION)
12. SYSTEMS ENGINEER'S CONTROL PANEL (CENTER SECTION)
13. SYSTEMS ENGINEER'S CONTROL PANEL (LOWER SECTION)
14. SYSTEMS ENGINEER'S CONTROL PANEL PEDESTAL
15. NAVIGATOR'S INSTRUMENT PANEL
16. OBSERVER'S INSTRUMENT PANEL
17. LEFT CONSOLE
18. RIGHT CONSOLE

HA2-1262

Flight Compartment
Figure 1

GENERAL - MAINTENANCE PRACTICES

1. General

A. Maintenance of the instrument and control panels consists primarily of replacement of instruments, indicator lights, switches, or valves. If the entire panel must be removed, refer to the maintenance practices for the particular panel. The following procedures apply to all instruments and instrument panels. When any component is replaced, a functional check should be performed to ensure the proper operation of the system.

B. Before performing instrument and control panel maintenance, appropriate safety precautions should be observed. When replacing an instrument, switch, or similar component, circuit breakers should be opened to deenergize the circuit.

2. Safety Precautions

A. Remove Power from Circuit

(1) Open applicable circuit breakers.

(2) Install clamp HPV-5N (Burndy) or P4-5Ws (Nylon Molding Corporation) under circuit breaker button.

(3) Tag circuit breakers with warning sign:

WARNING: DO NOT CLOSE THIS CIRCUIT BREAKER. THIS CIRCUIT BREAKER MUST REMAIN OPEN UNTIL COMPLETION OF MAINTENANCE.

B. Deenergize Power Buses

(1) Disconnect external power.

(2) Tag external power receptacle with warning sign.

WARNING: DO NOT APPLY EXTERNAL POWER.

3. Removal/Installation Instruments (See Figure 201.)

CAUTION: DO NOT PRY INSTRUMENT FROM PANEL WITH SCREWDRIVER OR OTHER TOOLS AS INSTRUMENT AND PANEL MAY BE DAMAGED.

A. Remove Square Clamp-Mounted Instruments

(1) Open applicable system and lighting circuit breakers.

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

(2) Support instrument and loosen clamp adjustment screws.

(3) Press screws inward until flush with panel to release pressure of clamp on instrument.

(4) Loosen clamp attachment screws as necessary to relieve tension.

NOTE: Clamp attachment screws are smaller than clamp adjustment screws, and in some cases, may be countersunk.

(a) If removing a rack-and-panel connected instrument, maintain pressure on perimeter of instrument and allow it to eject slowly until spring tension is relieved. Carefully remove instrument from panel and cap all electrical connectors.

CAUTION: DO NOT ROTATE SPRING LOADED RACK-AND-PANEL CONNECTED INSTRUMENTS. ROTATION WILL DAMAGE ELECTRICAL CONNECTORS.

(b) If removing a pendant connected instrument, carefully remove instrument from panel and disconnect electrical connectors and lines. Cap all instrument vents, ports, lines, and electrical connectors and secure cable to prevent it falling back through panel opening.

B. Remove Round Clamp-Mounted Instruments

(1) Open applicable system and lighting circuit breakers.

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

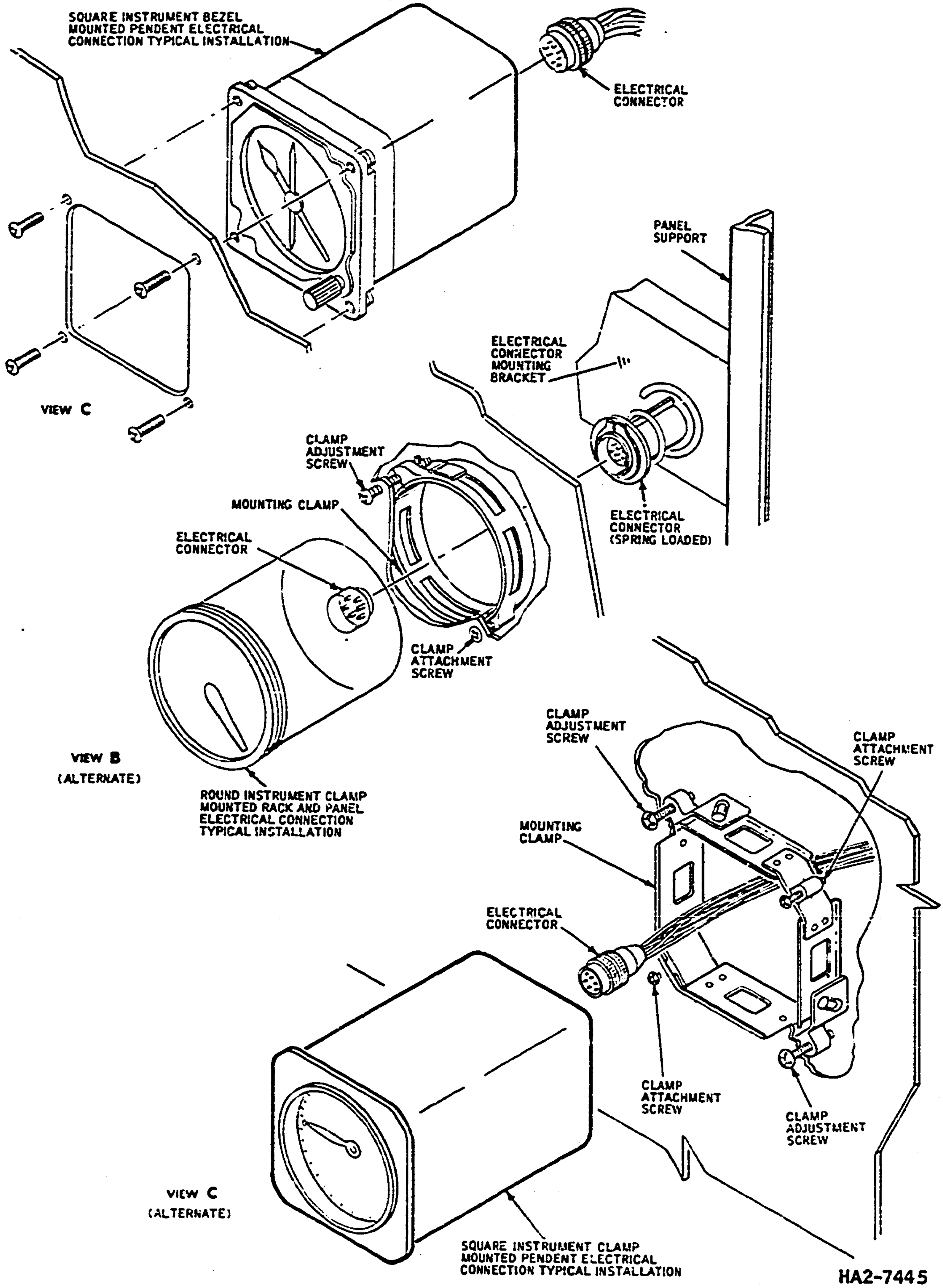
(2) Support instrument and loosen clamp adjustment screw.

NOTE: Clamp adjustment screw is larger than clamp attachment screw, and in some cases, the clamp attachment screw may be countersunk.

(a) If removing a rack-and-panel connected instrument, maintain pressure on perimeter of instrument and allow to eject slowly until spring tension is relieved. Carefully remove instrument from panel and cap all electrical connectors.

CAUTION: DO NOT ROTATE SPRING LOADED RACK-AND-PANEL CONNECTED INSTRUMENTS. ROTATION WILL DAMAGE ELECTRICAL CONNECTORS.

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Instruments -- Typical Installation
Figure 201

(b) If removing a pendant connected instrument, carefully remove instrument from panel and disconnect electrical connectors and lines. Cap all instrument vents, ports, lines, and electrical connectors and secure cable to prevent it falling back through panel opening.

C. Install Square Or Round Clamp-Mounted Instruments

(1) Check applicable circuit breakers are open.

(2) Remove caps and plugs from all instrument vents, ports, lines, and electrical connectors.

(3) Install lines and electrical connectors on instrument.

(4) Tighten lines to torque values specified in Figure 202.

(5) Position instrument in cavity. Rack-and-panel connected instruments must be positioned so that electrical connector is aligned with receptacle and held in place with hand pressure.

<u>CAUTION:</u> DO NOT ROTATE SPRING LOADED RACK-AND-PANEL CONNECTED INSTRUMENTS. ROTATION WILL DAMAGE ELECTRICAL CONNECTORS.

STANDARD TORQUE VALUE FOR AN818 B-NUTS

Tube Size	B-Nut Hex Size	Torque Value (inch-pounds)			
		Aluminum		Steel	
		Standard	Oxygen	Standard	Firex
1/8	3/8	12.5		35-45	
3/16	7/16	28.5		100	
1/4	9/16	50	50-75	150	
5/16	5/8	78	100-125	200	
3/8	11/16	112	200-250	300	
1/2	7/8	200	300-400	500	500
5/8	1	312		700	500
3/4	1 1/4	450		1000	500
1	1 1/2	600		1400-1500	1300
1 1/4	2	750		3400	1700
1 1/2	2 1/4	900		4400	2100
1 3/4	2 5/8	1050			2500
2	2 7/8	1200		5500	2900

NOTE: Tighten AN818 B-nuts to the above values, using the torque based on the tube material regardless of fitting or nut material. See Chapter 20 for detailed torque information.

Torque Value Chart
Figure 202

(6) Tighten clamp attachment screws where they have been loosened.

NOTE: Clamp attachment screws are smaller than clamp adjustment screws and in some cases, may be countersunk.

(7) Tighten clamp adjustment screws.

(8) Close circuit breakers.

(9) Check operation of instrument.

D. Remove Bezel-Mounted Instruments

(1) Open applicable system and lighting circuit breakers.

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

(2) Gain access to instrument.

NOTE: Bezel-mounted instruments may be type which removes from front of panel or type which removes from back of panel.

(3) Remove screws from instrument bezel.

(4) Remove instrument from panel and disconnect electrical connectors and lines.

(5) Cap or plug all instrument vents, ports, lines, and electrical connectors.

E. Install Bezel-Mounted Instruments

(1) Check that applicable circuit breakers are open.

(2) Remove caps or plugs from all instrument vents, ports, lines, and electrical connectors.

(3) Install lines and electrical connectors on instrument.

(4) Tighten lines to torque values specified in Figure 202.

(5) Position instrument in panel and secure with screws through bezel.

(6) Replace equipment removed for access.

(7) Close circuit breakers.

(8) Check operation of instrument.

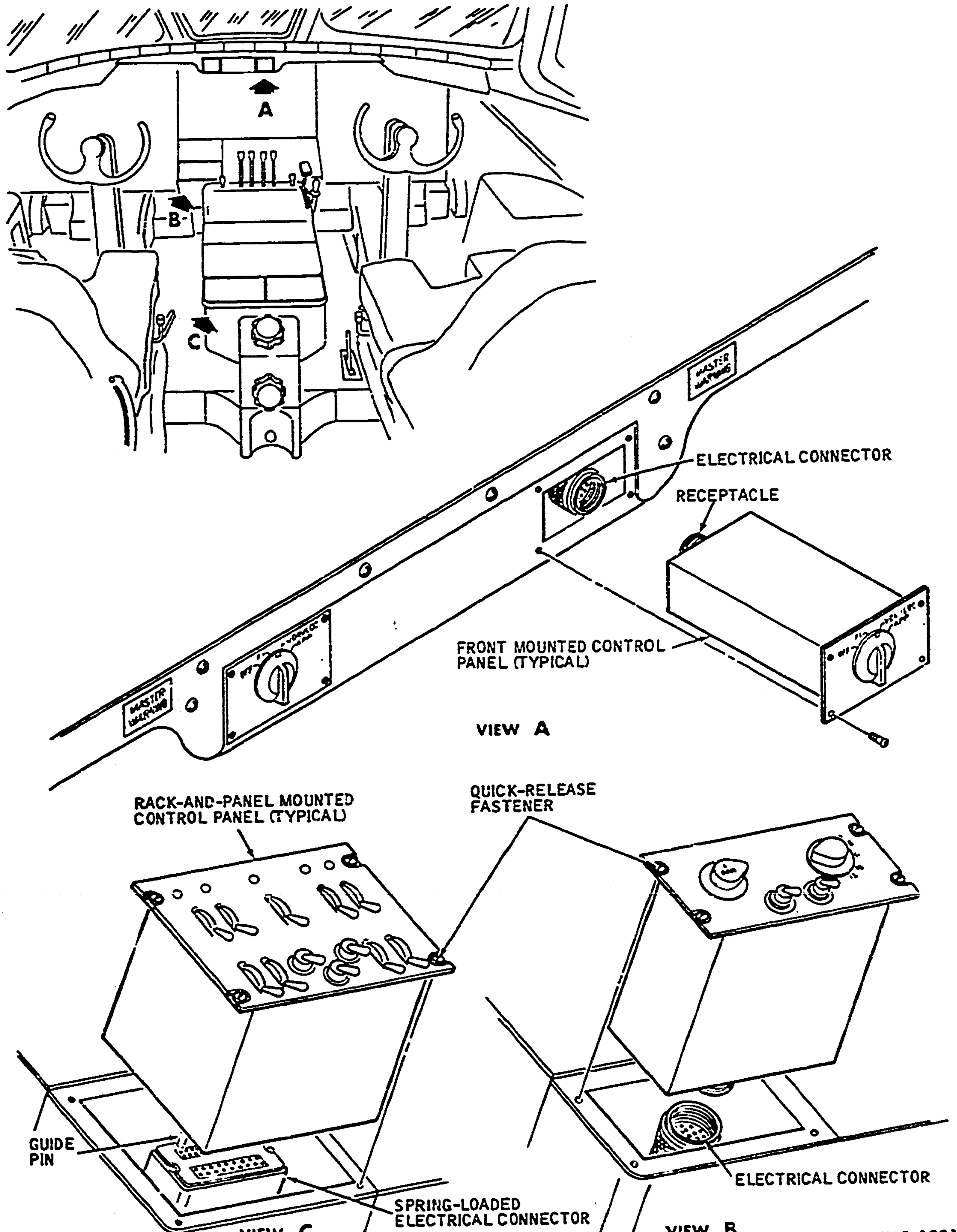
4. <u>Removal/Installation Control Panels</u> (See Figure 203.)

A. Remove Control Panels

(1) Open applicable system and lighting circuit breakers.

<u>WARNING</u>: TAG AND SAFETY CIRCUIT BREAKERS.

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Control Panel Replacement
Figure 203

(2) Release quick-disconnect fasteners or remove attaching screws.

CAUTION: HOLD RACK AND PANEL TYPE CONTROL PANELS FIRMLY IN PLACE WHILE RELEASING FASTENERS. PANELS ARE SPRING LOADED AND CONNECTORS COULD BE DAMAGED IF NOT REMOVED CAREFULLY.

(3) Remove panel from cavity and disconnect electrical connectors and lines.

(4) Cap all electrical connectors and lines.

B. Install Control Panels

(1) Ensure applicable circuit breakers are open.

(2) Remove caps from all electrical connectors and lines.

(3) Install electrical connectors and lines on panel.

(4) Position panel in cavity and secure with fasteners or attaching screws.

NOTE: Rack and panel type control panels must have electrical connectors aligned with receptacles and be pressed firmly into position before securing fasteners.

(5) Perform operational test of all systems involved to determine integrity of new installation.

5. Removal/Installation Indicator Lights (See Figure 204.)

NOTE: To relamp, lift off indicator light cap, remove burned out lamp, install new lamp, and replace light cap.

A. Remove Indicator Lights

(1) Open applicable system circuit breakers.

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

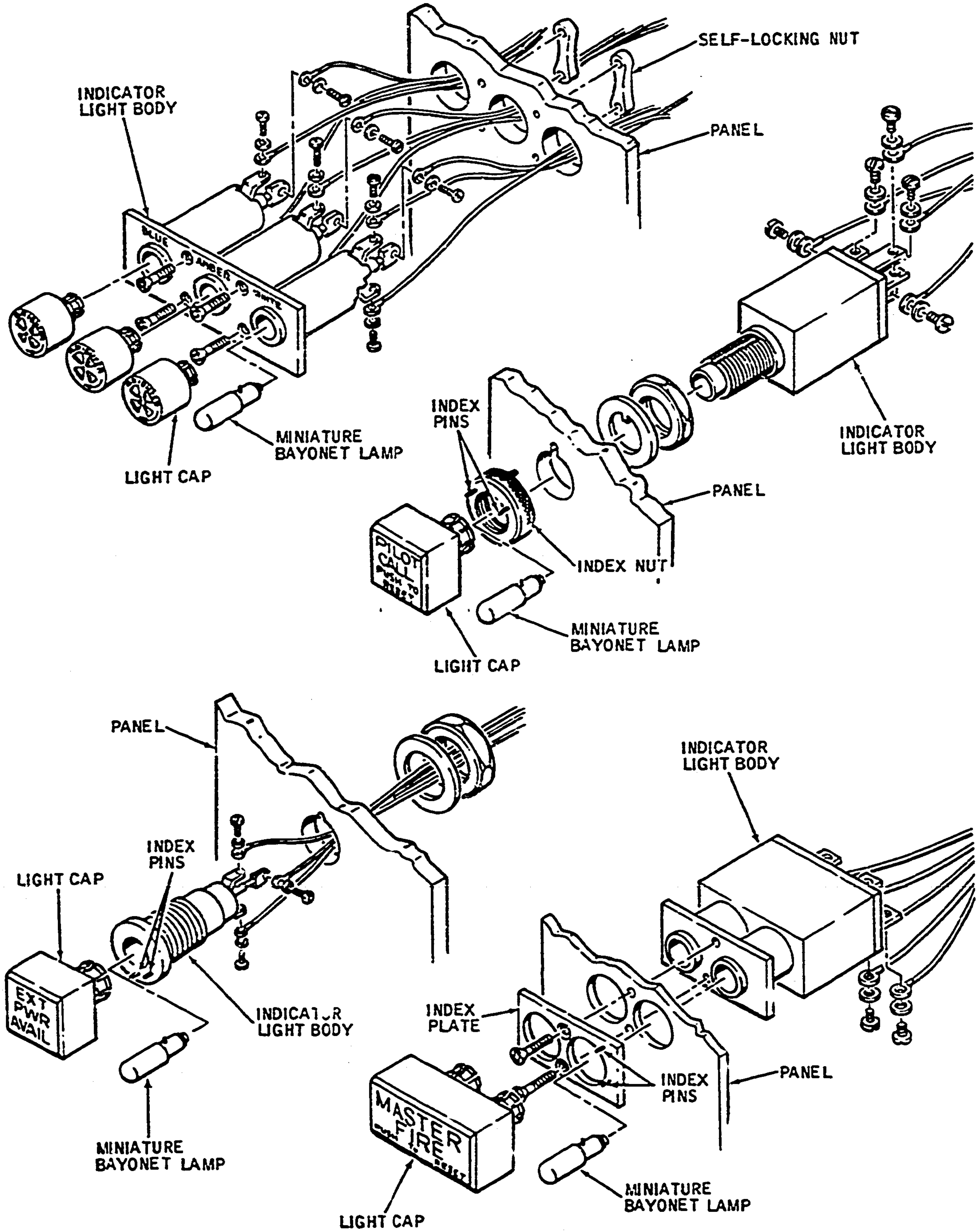
(2) Gain access to indicator light.

(3) Remove cap by lifting off.

(4) Remove attaching screws from front of light or remove nut and lock washer from light housing behind panel, and remove indicator light from panel.

NOTE: Indicator light may be of type which removes from front of panel or of type which removes from back of panel.

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Indicator Light Replacement
Figure 204

(5) Disconnect and tag electrical wiring.

(6) Remove indicator light.

B. Install Indicator Lights

(1) Ensure applicable circuit breakers are open.

(2) Connect electrical wiring to indicator light.

(3) Position light on panel and secure with retainer and screws or with nut and lock washer.

(4) Install cap on indicator light.

(5) Replace equipment removed for access.

(6) Close circuit breakers.

(7) Perform operational test of light to determine integrity of new installation.

6. Removal/Installation Switches (See Figure 205.)

A. Remove Switch

(1) Open applicable system circuit breakers.

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

(2) Gain access to switch.

(3) Remove gang switch handle or switch knob and lightplate if installed.

(4) Remove nut securing switch to panel and remove switch from panel.

NOTE: Guard should be retained if one is installed.

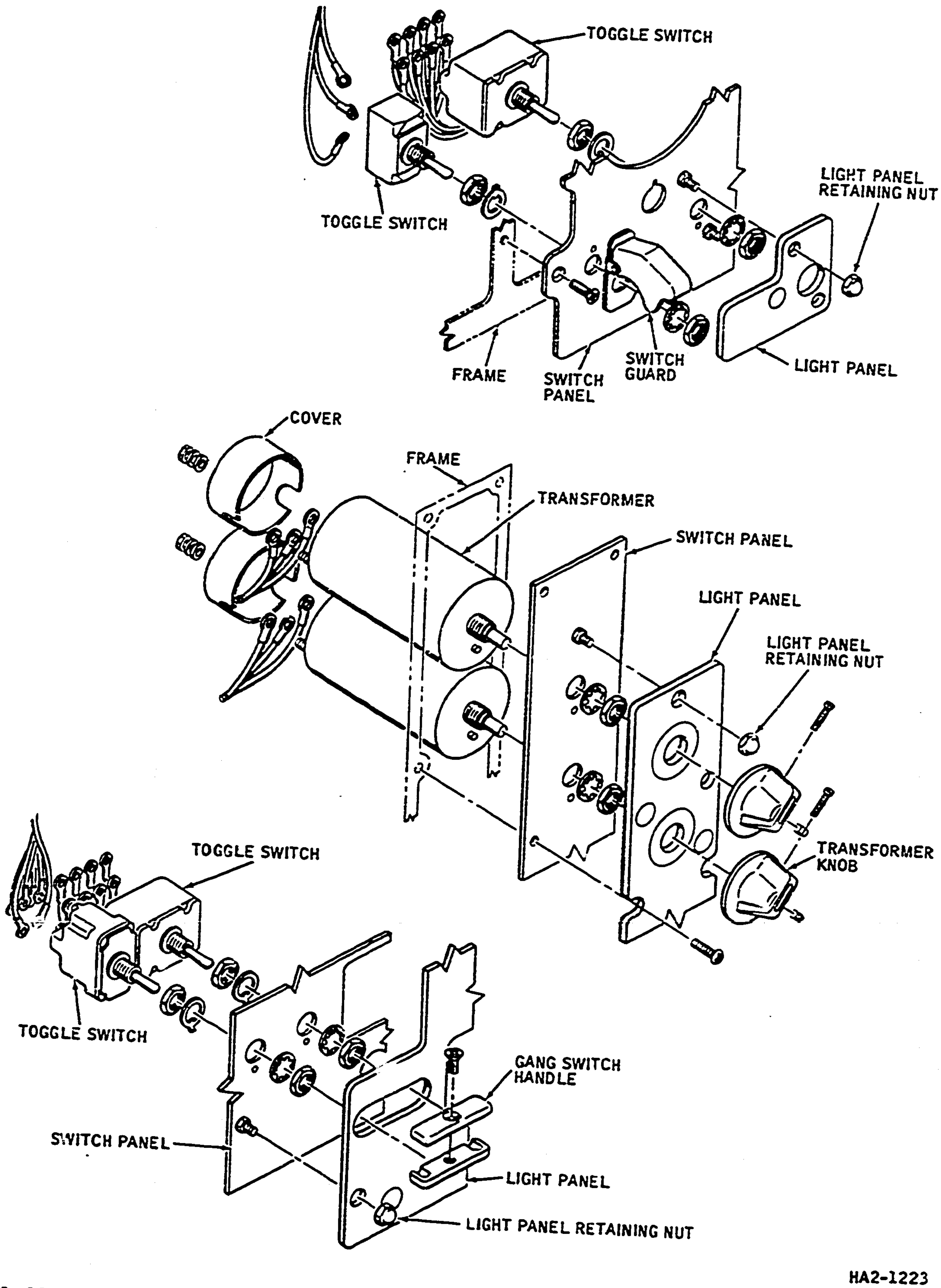
(5) Disconnect and tag electrical wiring.

(6) Remove switch.

B. Install Switch

(1) Ensure applicable circuit breakers are open.

(2) Connect electrical wiring to switch.



Switch Replacement
Figure 205

(3) Position switch on panel and secure with nut and lock washer.

NOTE: Guard should be installed under nut and lock washer if one is required.

(4) Install lightplate and switch knob or gang switch handle if required.

(5) Replace panels removed for access.

(6) Close circuit breakers.

(7) Perform operational test to determine integrity of new intallation.

7. Removal/Installation Valves (See Figure 206.)

A. Remove Valve

(1) Open applicable system and lighting circuit breakers.

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

(2) Gain access to valve.

(3) Remove knob from valve.

(4) Remove lightplate from panel.

(5) Remove lines from valve fittings.

(6) Cap or plug all lines and fittings to prevent contamination.

(7) Remove attaching screws and remove valve from panel.

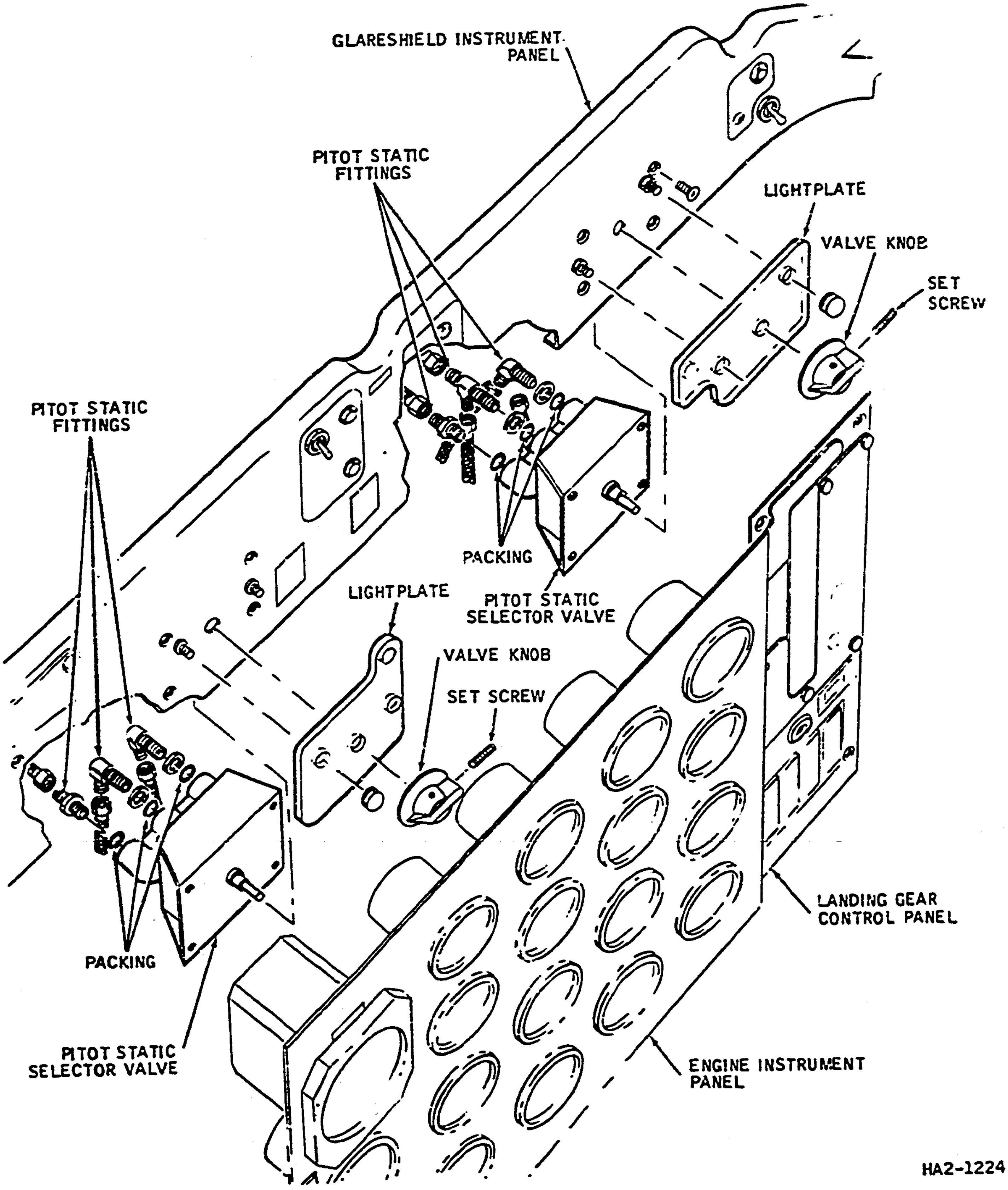
(8) Remove fittings from valve and retain for installation on replacement valve.

B. Install Valve

(1) Ensure applicable circuit breakers are open.

(2) Install fittings on valve and tighten within torque limits specified in Figure 202, retaining proper position of fittings.

(3) Position valve on panel and secure with attaching screws.



Valve Replacement
Figure 206

(4) Remove caps or plugs from all fittings and lines.

(5) Install lines on valve and tighten to torque value specified in Figure 202.

(6) Install lightplate on panel.

(7) Install knob on valve.

(8) Replace all equipment removed for access.

(9) Close circuit breakers.

(10) Test systems involved. (See Chapter 34.)

GENERAL - MAINTENANCE PRACTICES

1. General

A. Maintenance of the instrument and control panels consists primarily of replacement of instruments, indicator lights, switches, or valves. If the entire panel must be removed, refer to the maintenance practices for the particular panel. The following procedures apply to all instruments and instrument panels. When any component is replaced, a functional check should be performed to ensure the proper operation of the system.

B. Before performing instrument and control panel maintenance, appropriate safety precautions should be observed. When replacing an instrument, switch, or similar component, circuit breakers should be opened to deenergize the circuit.

2. Safety Precautions

A. Remove Power from Circuit

(1) Open applicable circuit breakers.

(2) Install clamp HPV-5N (Burndy) or P4-5Ws (Nylon Molding Corporation) under circuit breaker button.

(3) Tag circuit breakers with warning sign:

WARNING: DO NOT CLOSE THIS CIRCUIT BREAKER. THIS CIRCUIT BREAKER MUST REMAIN OPEN UNTIL COMPLETION OF MAINTENANCE.

B. Deenergize Power Buses

(1) Disconnect external power.

(2) Tag external power receptacle with warning sign.

WARNING: DO NOT APPLY EXTERNAL POWER.

3. Removal/Installation Instruments (See Figure 201.)

CAUTION: DO NOT PRY INSTRUMENT FROM PANEL WITH SCREWDRIVER OR OTHER TOOLS AS INSTRUMENT AND PANEL MAY BE DAMAGED.

A. Remove Square Clamp-Mounted Instruments

(1) Open applicable system and lighting circuit breakers.

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

(2) Support instrument and loosen clamp adjustment screws.

(3) Press screws inward until flush with panel to release pressure of clamp on instrument.

(4) Loosen clamp attachment screws as necessary to relieve tension.

NOTE: Clamp attachment screws are smaller than clamp adjustment screws, and in some cases, may be countersunk.

(a) If removing a rack-and-panel connected instrument, maintain pressure on perimeter of instrument and allow it to eject slowly until spring tension is relieved. Carefully remove instrument from panel and cap all electrical connectors.

CAUTION: DO NOT ROTATE SPRING LOADED RACK-AND-PANEL CONNECTED INSTRUMENTS. ROTATION WILL DAMAGE ELECTRICAL CONNECTORS.

(b) If removing a pendant connected instrument, carefully remove instrument from panel and disconnect electrical connectors and lines. Cap all instrument vents, ports, lines, and electrical connectors and secure cable to prevent it falling back through panel opening.

B. Remove Round Clamp-Mounted Instruments

(1) Open applicable system and lighting circuit breakers.

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

(2) Support instrument and loosen clamp adjustment screw.

NOTE: Clamp adjustment screw is larger than clamp attachment screw, and in some cases, the clamp attachment screw may be countersunk.

(a) If removing a rack-and-panel connected instrument, maintain pressure on perimeter of instrument and allow to eject slowly until spring tension is relieved. Carefully remove instrument from panel and cap all electrical connectors.

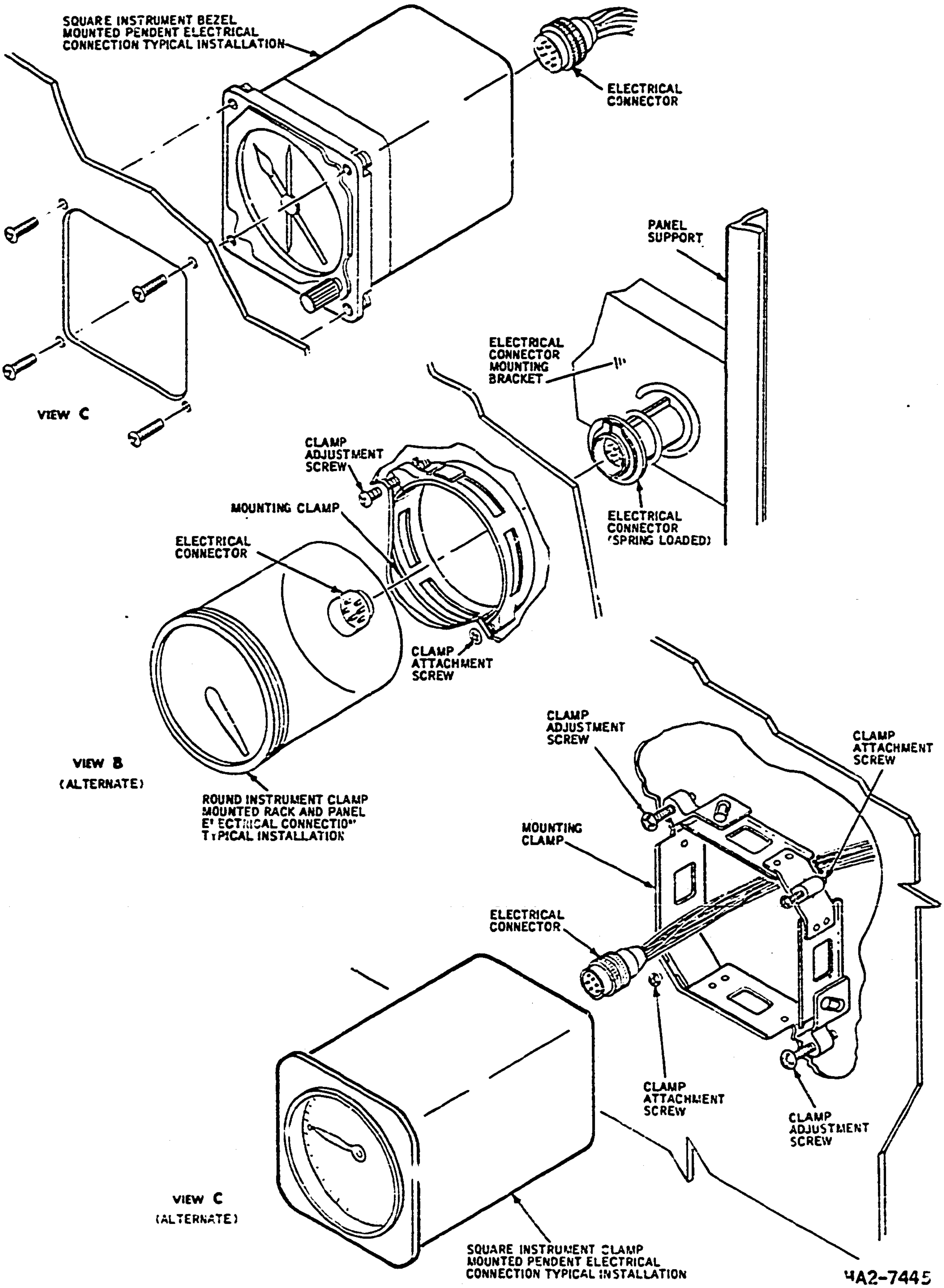
CAUTION: DO NOT ROTATE SPRING LOADED RACK-AND-PANEL CONNECTED INSTRUMENTS. ROTATION WILL DAMAGE ELECTRICAL CONNECTORS.

(b) If removing a pendant connected instrument, carefully remove instrument from panel and disconnect electrical connectors and lines. Cap all instrument vents, ports, lines, and electrical connectors and secure cable to prevent it falling back through panel opening.

C. Install Square Or Round Clamp-Mounted Instruments

(1) Check applicable circuit breakers are open.

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Instruments -- Typical Installation
Figure 201

(2) Remove caps and plugs from all instrument vents, ports, lines, and electrical connectors.

(3) Install lines and electrical connectors on instrument.

(4) Tighten lines to torque values specified in Figure 202.

(5) Position instrument in cavity. Rack-and-panel connected instruments must be positioned so that electrical connector is aligned with receptacle and held in place with hand pressure.

CAUTION: DO NOT ROTATE SPRING LOADED RACK-AND-PANEL CONNECTED INSTRUMENTS. ROTATION WILL DAMAGE ELECTRICAL CONNECTORS.

(6) Tighten clamp attachment screws where they have been loosened.

NOTE: Clamp attachment screws are smaller than clamp adjustment screws and in some cases, may be countersunk.

(7) Tighten clamp adjustment screws.

(8) Close circuit breakers.

(9) Check operation of instrument.

D. Remove Bezel-Mounted Instruments

(1) Open applicable system and lighting circuit breakers.

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

(2) Gain access to instrument.

NOTE: Bezel-mounted instruments may be type which removes from front of panel or type which removes from back of panel.

(3) Remove screws from instrument bezel.

(4) Remove instrument from panel and disconnect electrical connectors and lines.

(5) Cap or plug all instrument vents, ports, lines, and electrical connectors.

E. Install Bezel-Mounted Instruments

(1) Check that applicable circuit breakers are open.

(2) Remove caps or plugs from all instrument vents, ports, lines, and electrical connectors.

(3) Install lines and electrical connectors on instrument.

(4) Tighten lines to torque values specified in Figure 202.

(5) Position instrument in panel and secure with screws through bezel.

(6) Replace equipment removed for access.

(7) Close circuit breakers.

(8) Check operation of instrument.

4. Removal/Installation Control Panels (See Figure 203.)

A. Remove Control Panels

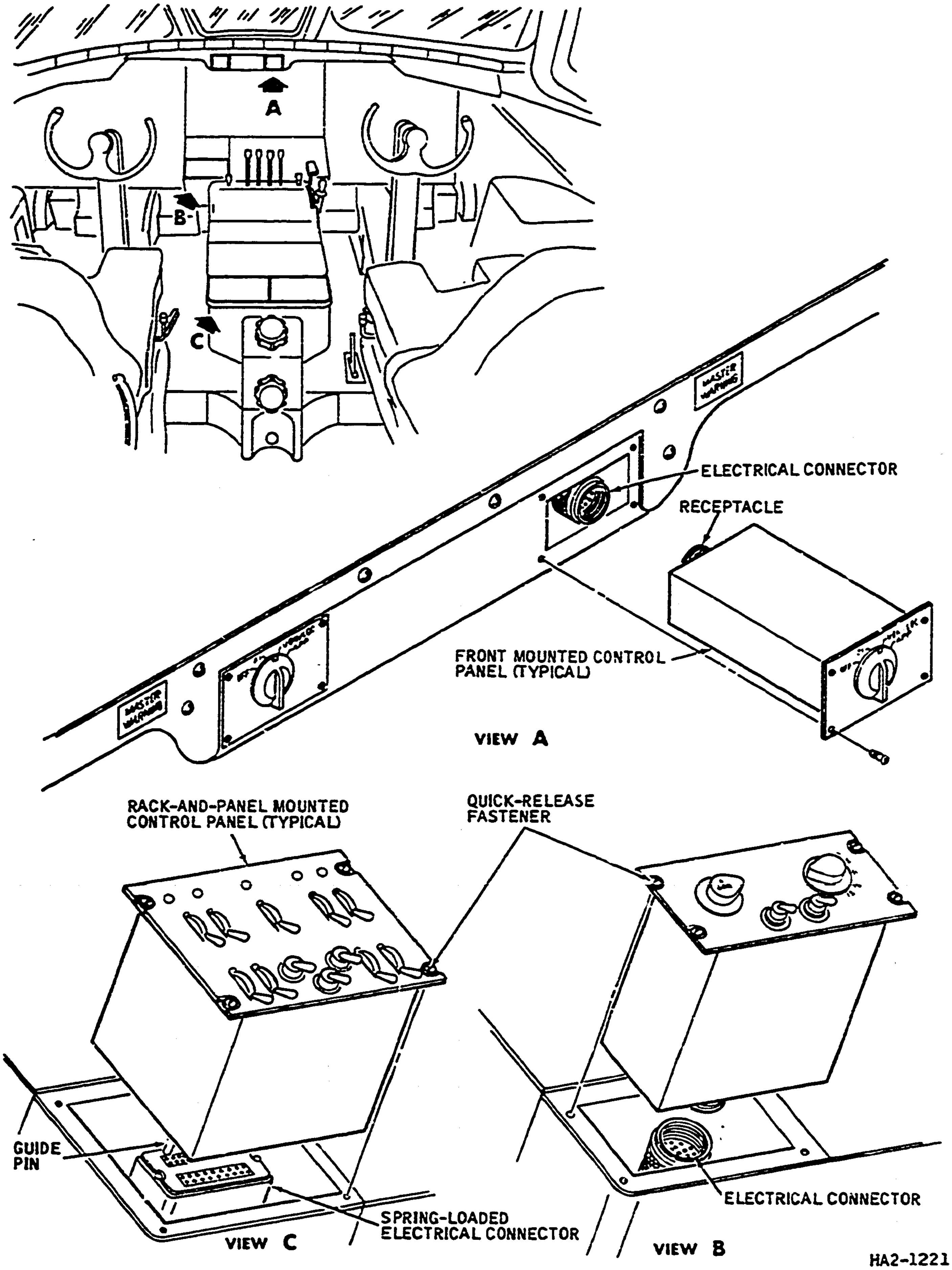
(1) Open applicable system and lighting circuit breakers.

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

	STANDARD TORQUE VALUE FOR AN818 B-NUTS				
Tube Size	B-Nut Hex Size	Torque Value (inch-pounds)			
		Aluminum		Steel	
		Standard	Oxygen	Standard	Firex
1/8	3/8	12.5		35-45	
3/16	7/16	28.5		100	
1/4	9/16	50	50-75	150	
5/16	5/8	78	100-125	200	
3/8	11/16	112	200-250	300	
1/2	7/8	200	300-400	500	500
5/8	1	312		700	500
3/4	1 1/4	450		1000	500
1	1 1/2	600		1400-1500	1300
1 1/4	2	750		3400	1700
1 1/2	2 1/4	900		4400	2100
1 3/4	2 5/8	1050			2500
2	2 7/8	1200		5500	2900

NOTE: Tighten AN818 B-nuts to the above values, using the torque based on the tube material regardless of fitting or nut material. See Chapter 20 for detailed torque information.

Torque Value Chart
Figure 202



Control Panel Replacement
Figure 203

(2) Release quick-disconnect fasteners or remove attaching screws.

CAUTION: HOLD RACK AND PANEL TYPE CONTROL PANELS FIRMLY IN PLACE WHILE RELEASING FASTENERS. PANELS ARE SPRING LOADED AND CONNECTORS COULD BE DAMAGED IF NOT REMOVED CAREFULLY.

(3) Remove panel from cavity and disconnect electrical connectors and lines.

(4) Cap all electrical connectors and lines.

B. Install Control Panels

(1) Ensure applicable circuit breakers are open.

(2) Remove caps from all electrical connectors and lines.

(3) Install electrical connectors and lines on panel.

(4) Position panel in cavity and secure with fasteners or attaching screws.

NOTE: Rack and panel type control panels must have electrical connectors aligned with receptacles and be pressed firmly into position before securing fasteners.

(5) Perform operational test of all systems involved to determine integrity of new installation.

5. Removal/Installation Indicator Lights (See Figure 204, Sheet 1 and 2.)

NOTE: To relamp, lift off indicator light cap, remove burned out lamp, install new lamp, and replace light cap.

A. Remove Indicator Lights

(1) Open applicable system circuit breakers.

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

(2) Gain access to indicator light.

(3) Remove cap by lifting off.

(4) Remove attaching screws from front of light or remove nut and lock washer from light housing behind panel, and remove indicator light from panel.

NOTE: Indicator light may be of type which removes from front of panel or of type which removes from back of panel.

(5) Disconnect and tag electrical wiring.

(6) Remove indicator light.

B. Install Indicator Lights

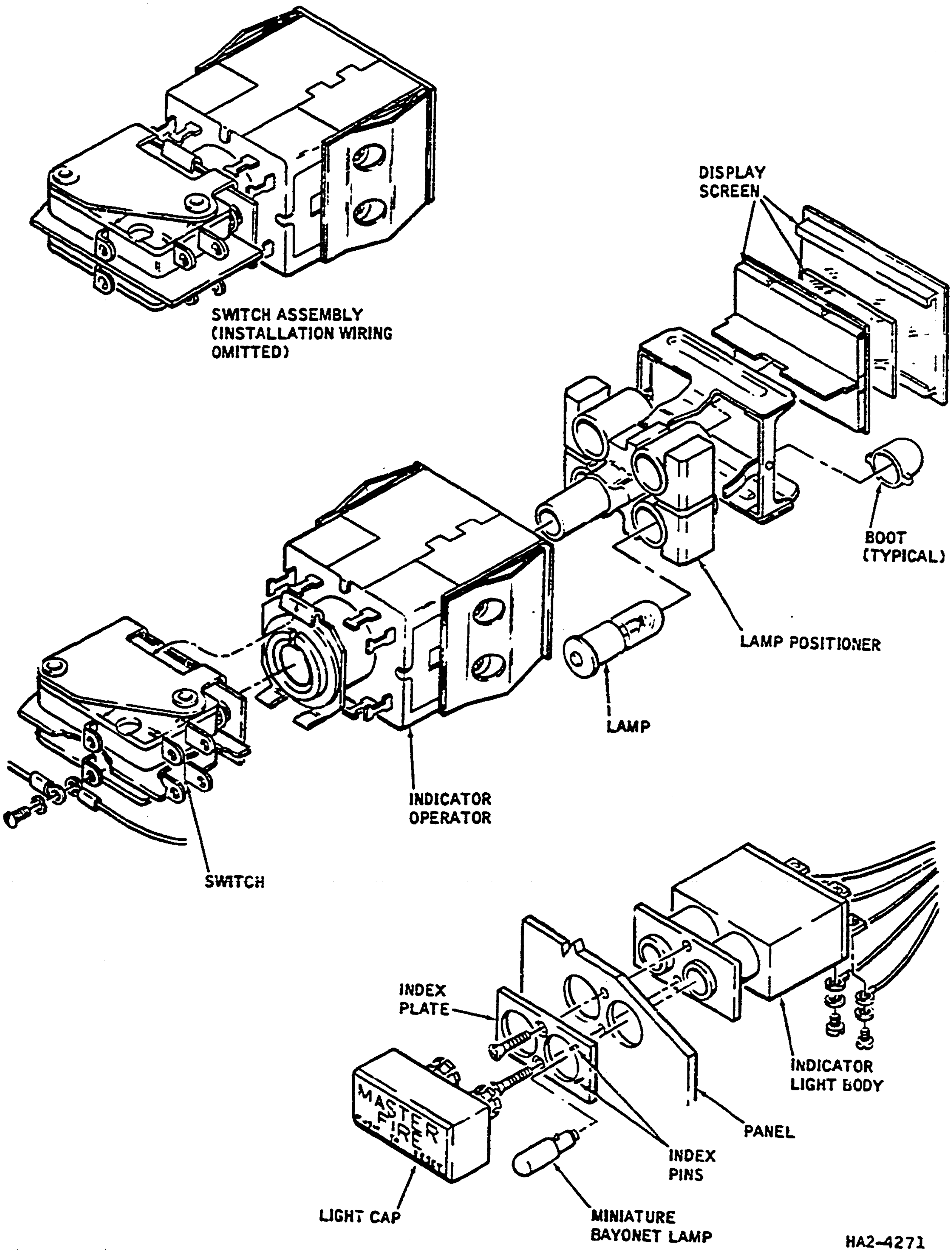
(1) Ensure applicable circuit breakers are open.

(2) Connect electrical wiring to indicator light.

(3) Position light on panel and secure with retainer and screws or with nut and lock washer.

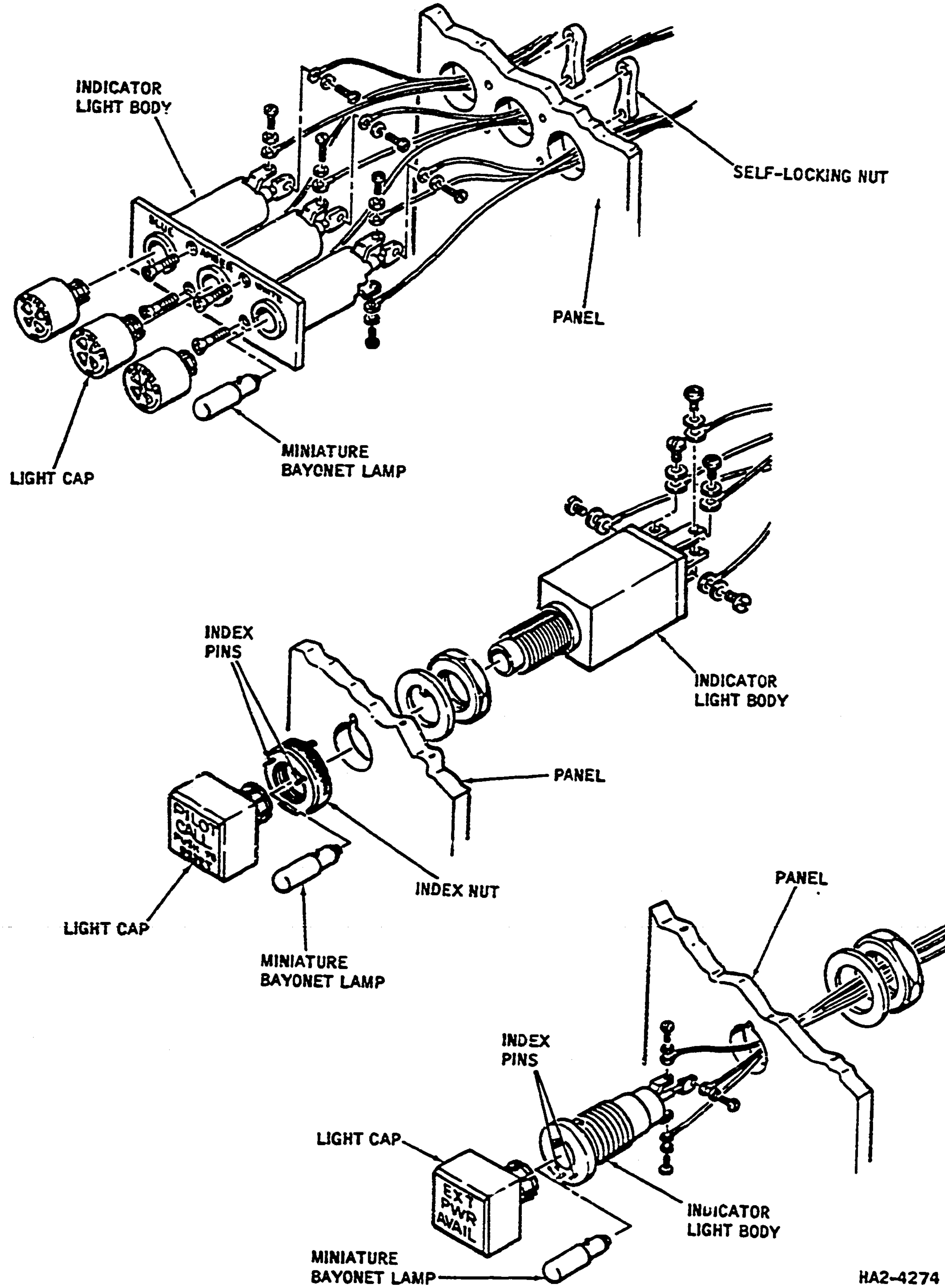
(4) Install cap on indicator light.

(5) Replace equipment removed for access.



Indicator Light Replacement
Figure 204 (Sheet 1)

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Indicator Light Replacement
Figure 204 (Sheet 2)

(6) Close circuit breakers.

(7) Perform operational test of light to determine integrity of new installation.

6. Removal/Installation Indicator Lights (See Figure 204, Sheet 2.)

A. Replace Indicator Lamps

(1) Slide off indicator light cap.

(2) Remove display screen.

(3) Pull cage and lamps out of operator indicator.

(4) Remove boots.

(5) Press lamp out of cage socket.

(6) Install new lamp into socket.

(7) Install boots.

(8) Install cage as assembled into operator indicator.

(9) Install display screen and indicator light cap.

B. Remove Indicator Lights

(1) Open applicable system circuit breakers.

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

(2) Gain access to indicator light.

(3) Slide off indicator light cap and remove display screen.

(4) Release spring pressure and remove indicator light from panel.

(5) Remove operator indicator from switch module.

NOTE: Indicator light is of the type that removes from the front of the panel.

(6) Disconnect and tag electrical wiring.

(7) Remove switch module.

C. Install Indicator Light

(1) Ensure applicable circuit breakers are open.

(2) Connect electrical wiring to switch module.

(3) Position operator on switch module and press light into panel cutout.

(4) Install display screen and secure with sliding cap.

(5) Close circuit breakers.

(6) Perform operational test of light to determine integrity of new installation.

7. Removal/Installation Switches (See Figure 205.)

A. Remove Switch

(1) Open applicable system circuit breakers.

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

(2) Gain access to switch.

(3) Remove gang switch handle or switch knob and lightplate if installed.

(4) Remove nut securing switch to panel and remove switch from panel.

NOTE: Guard should be retained if one is installed.

(5) Disconnect and tag electrical wiring.

(6) Remove switch.

B. Install Switch

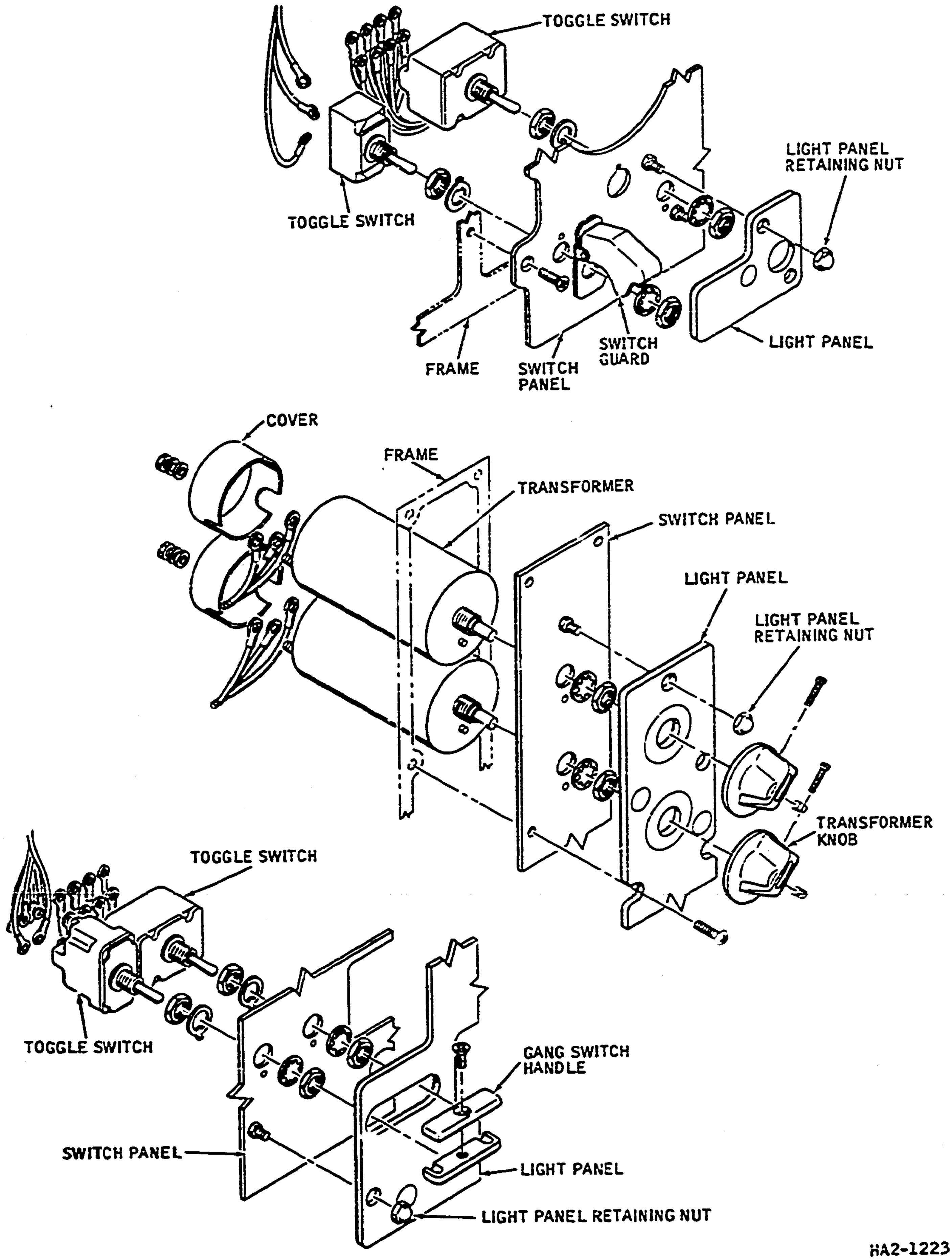
(1) Ensure applicable circuit breakers are open.

(2) Connect electrical wiring to switch.

(3) Position switch on panel and secure with nut and lock washer.

NOTE: Guard should be installed under nut and lock washer if one is required.

(4) Install lightplate and switch knob or gang switch handle if required.



Switch Replacement
Figure 205

(5) Replace panels removed for access.

(6) Close circuit breakers.

(7) Perform operational test to determine integrity of new installation.

8. Removal/Installation Valves (See Figure 206.)

A. Remove Valve

(1) Open applicable system and lighting circuit breakers.

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

(2) Gain access to valve.

(3) Remove knob from valve.

(4) Remove lightplate from panel.

(5) Remove lines from valve fittings.

(6) Cap or plug all lines and fittings to prevent contamination.

(7) Remove attaching screws and remove valve from panel.

(8) Remove fittings from valve and retain for installation on replacement valve.

B. Install Valve

(1) Ensure applicable circuit breakers are open.

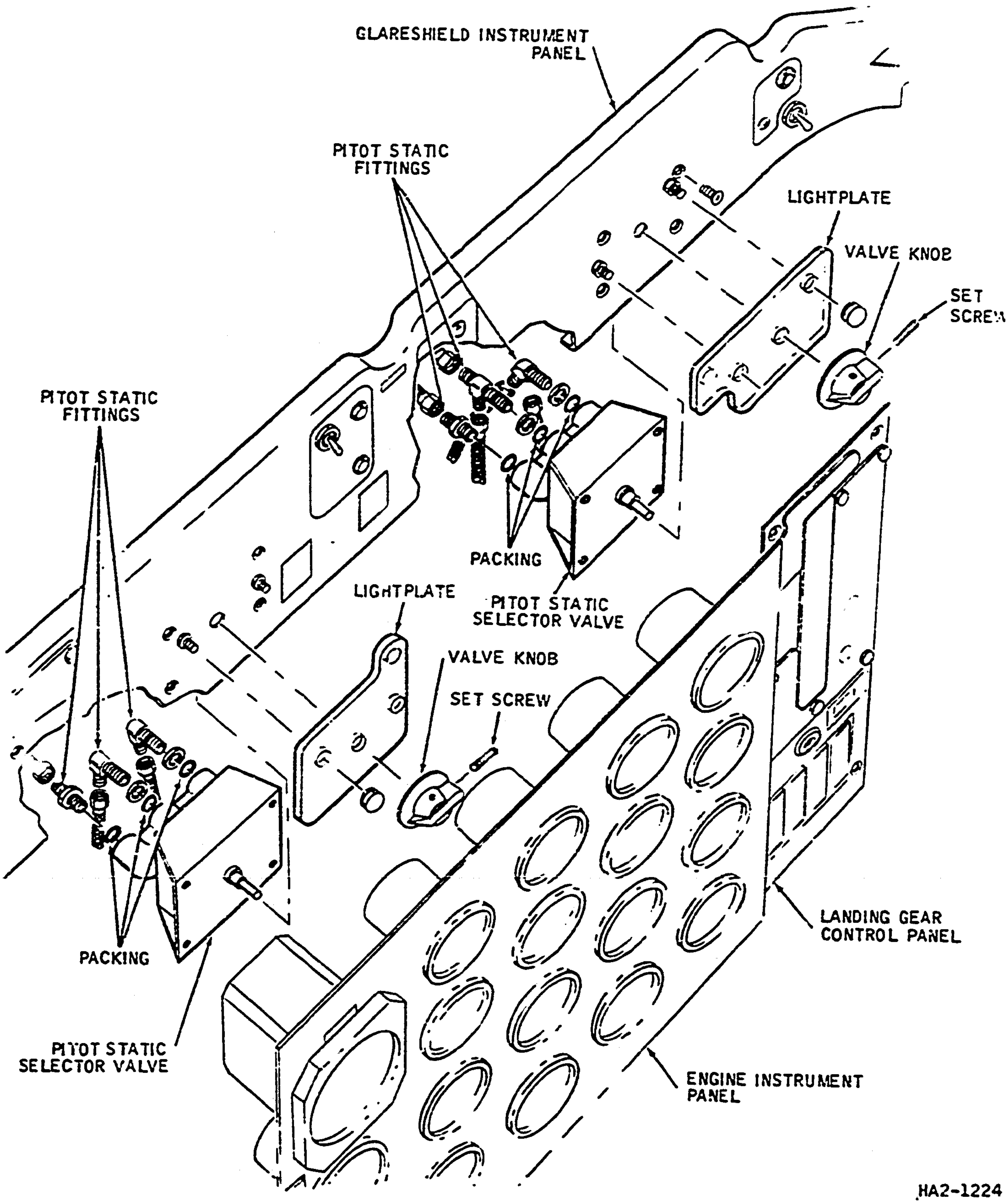
(2) Install fittings on valve and tighten within torque limits specified in Figure 202, retaining proper position of fittings.

(3) Position valve on panel and secure with attaching screws.

(4) Remove caps or plugs from all fittings and lines.

(5) Install lines on valve and tighten to torque value specified in Figure 202.

(6) Install lightplate on panel.



Valve Replacement
Figure 206

(7) Install knob on valve.

(8) Replace all equipment removed for access.

(9) Close circuit breakers.

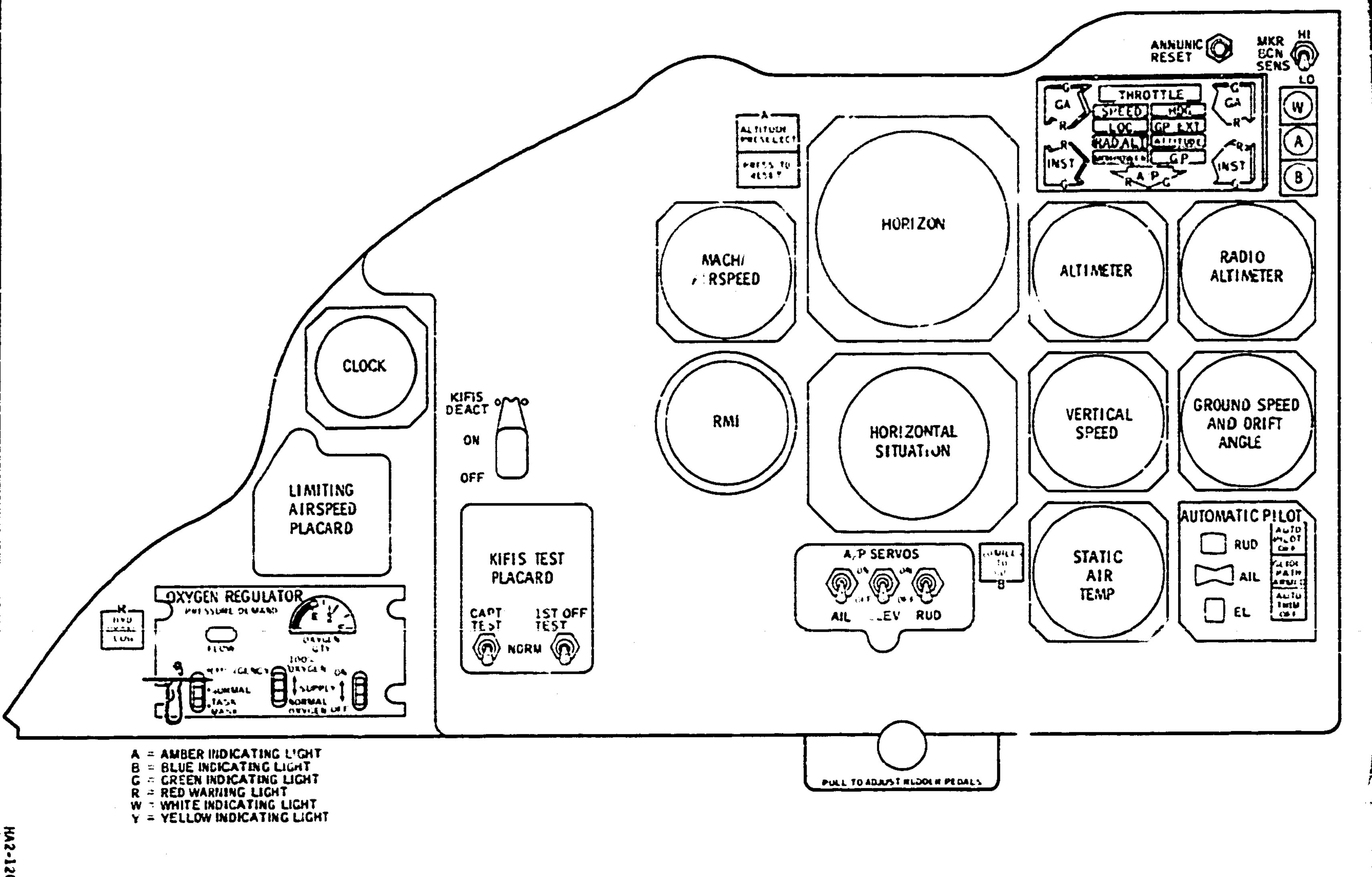
(10) Test systems involved. (See Chapter 34.)

PANELS - DESCRIPTION AND OPERATION

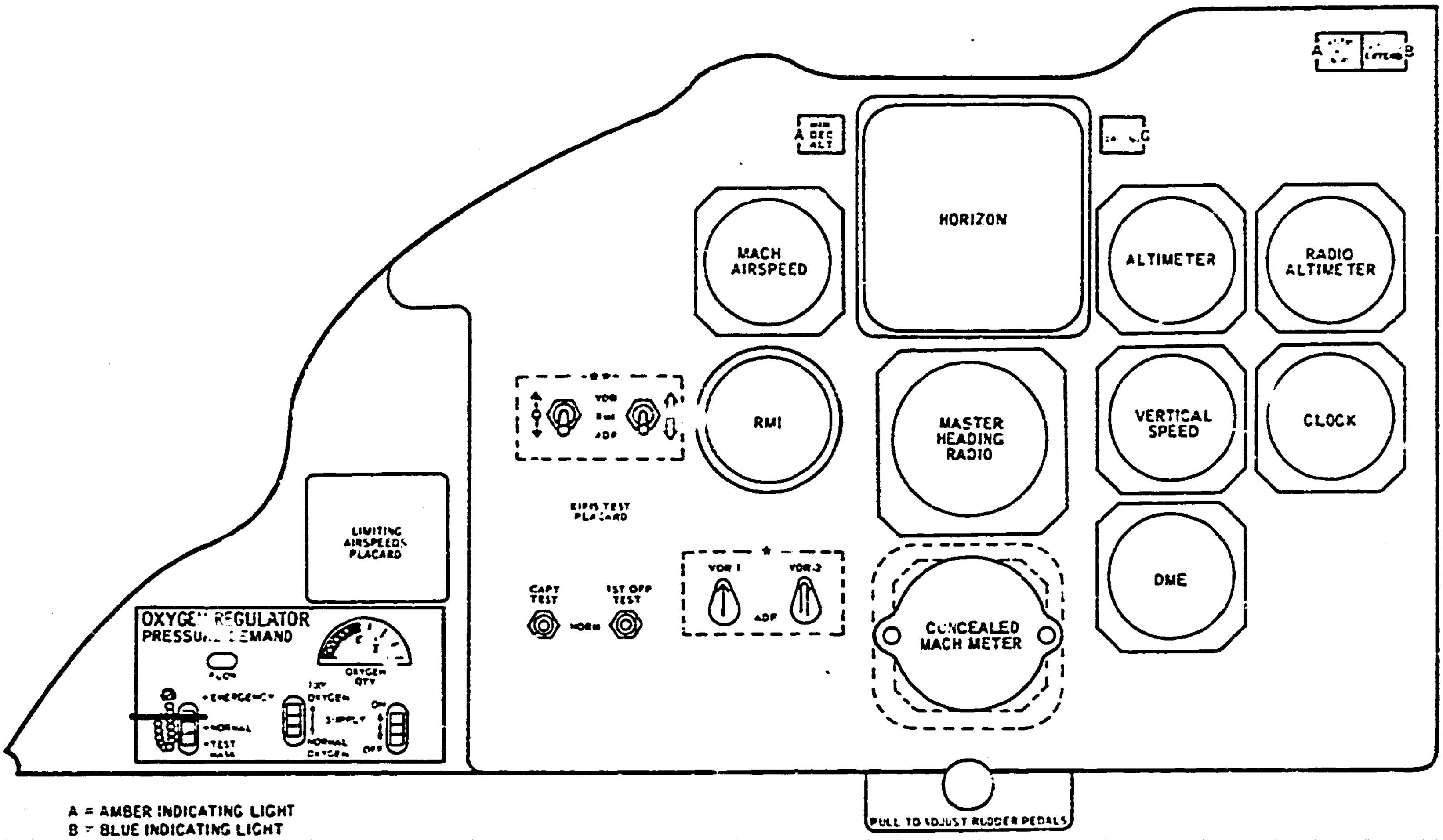
1. General

A. The main instrument panel, overhead switch panel, control pedestals, systems engineer's control panel, navigator's/observer's instrument panel, and left and right consoles mount instruments and control panels such as oxygen, lighting, and radio panels. Indicating and control components pertaining to an individual system are usually grouped on the panels in adjoining positions. The engine instrument panel and landing gear control panel are located in the center of the main instrument panel. The captain's instrument panel and the first officer's instrument panel pivot aft and down to gain access to instrument connectors and wiring. The systems engineer's control panel is divided into three sections, individually removable.

B. All flight, engine, and miscellaneous instruments have matte white dial markings on nonspecular black faces and are readable during daylight without artificial lighting. The standard instruments are graduated in U.S. or metric units of measurement, depending on customer requirement. All temperature indicators are graduated in degrees centigrade except the cabin temperature indicator which is graduated in degrees fahrenheit or degrees centigrade, depending on customer requirement. The airspeed indicators are graduated in knots or mach number as applicable. Instrument limitation markings are located on the dial of all instruments requiring such markings. Some instruments have integral warning flags to indicate malfunction or loss of electrical power to the instrument or associated system component, such as an amplifier, computer, or gyro.



Captain's Instrument Panel
Figure 1



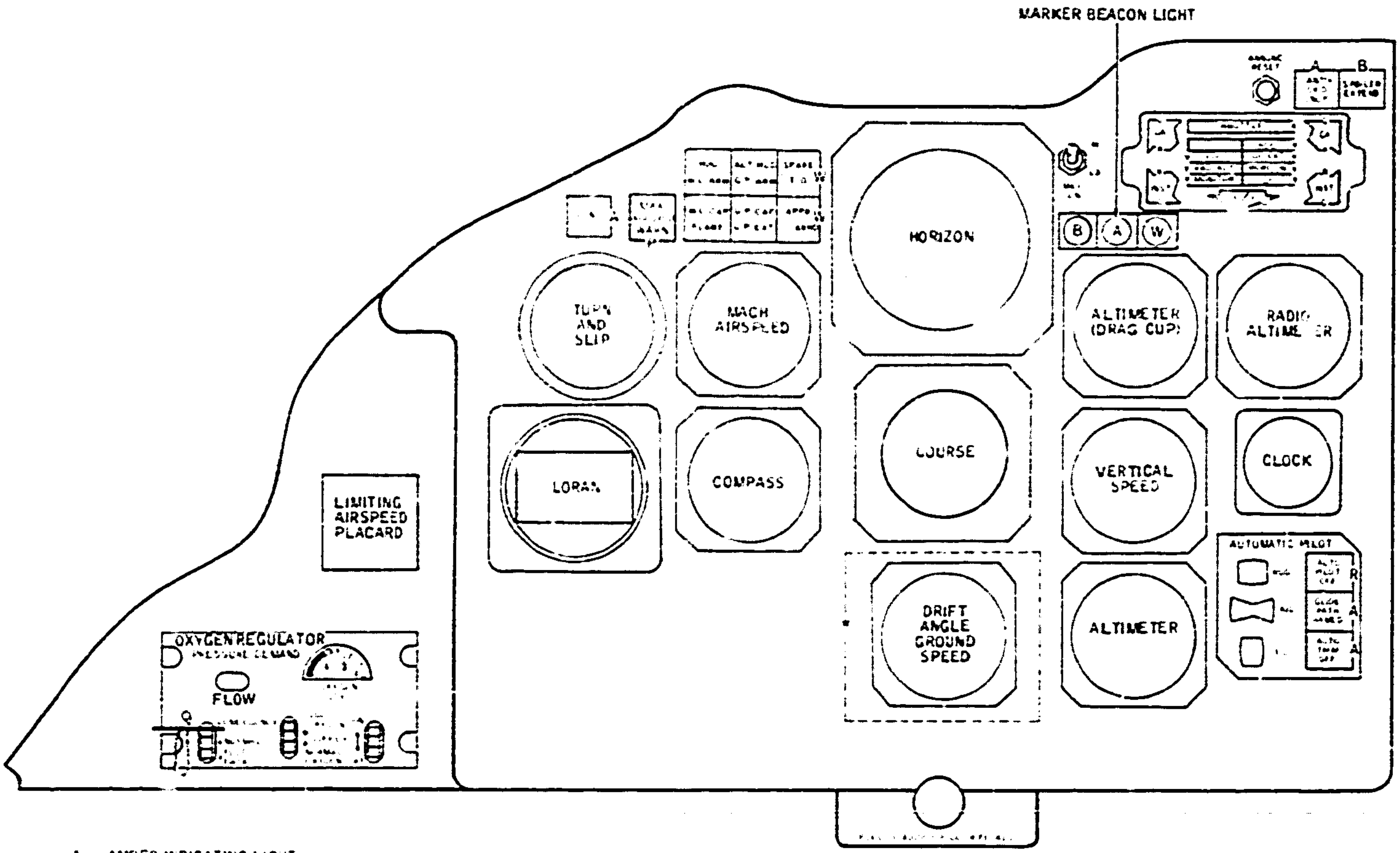
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT

* NOT INSTALLED ON N8070U, N8071U, N8072U, N8073U, N8074U, N8075U, N8076U

** INSTALLED ON N8070U, N8071U, N8072U, N8073U, N8074U, N8075U, N8076U

HA2-1225C

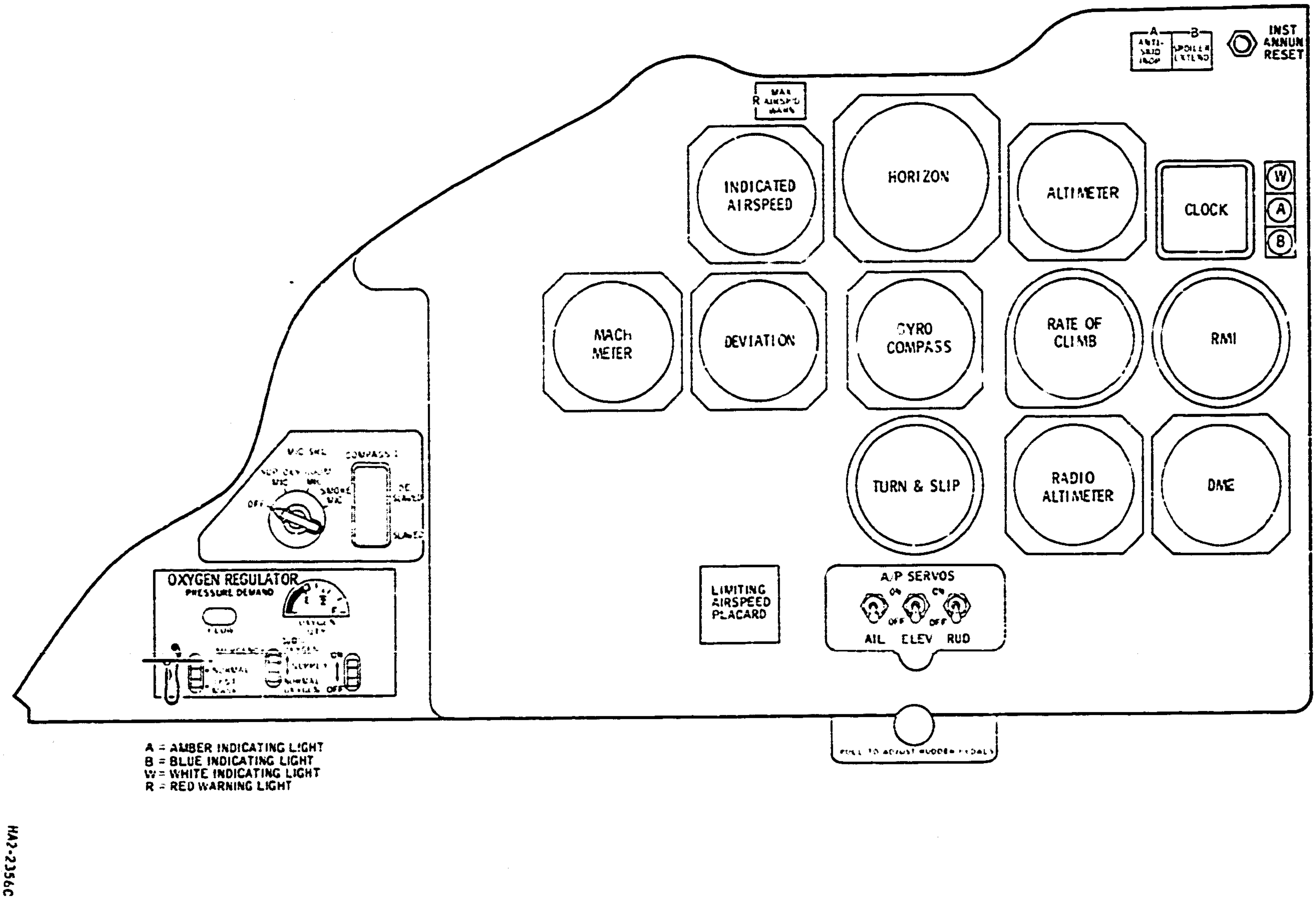
Captain's Flight Instrument Panel
Figure 1



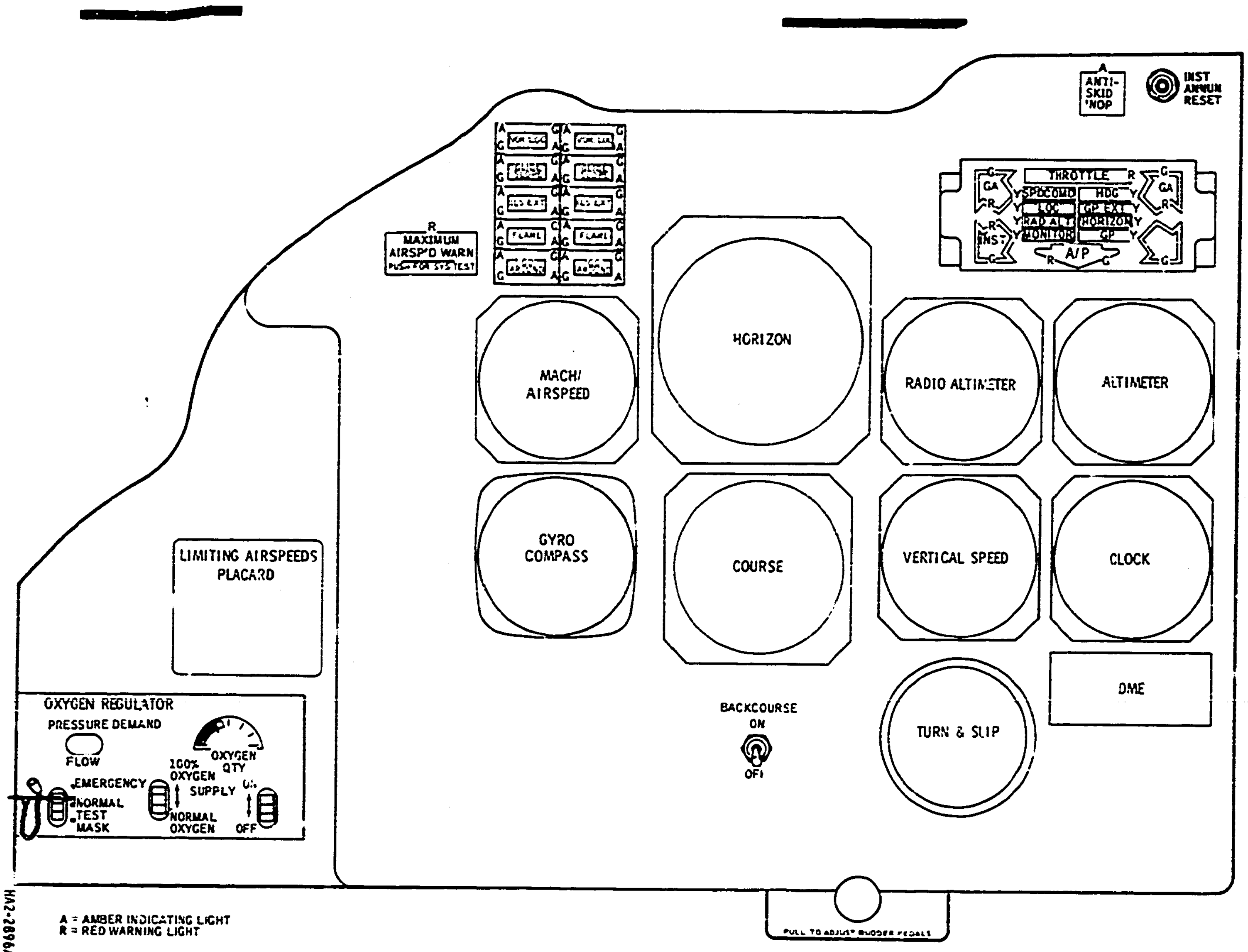
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT
R = RED WARNING LIGHT
W = WHITE INDICATING LIGHT
Y = YELLOW INDICATING LIGHT
*INSTALLED ON N8776-N8778

4A2-1324C

Captain's Flight Instrument Panel
Figure 1



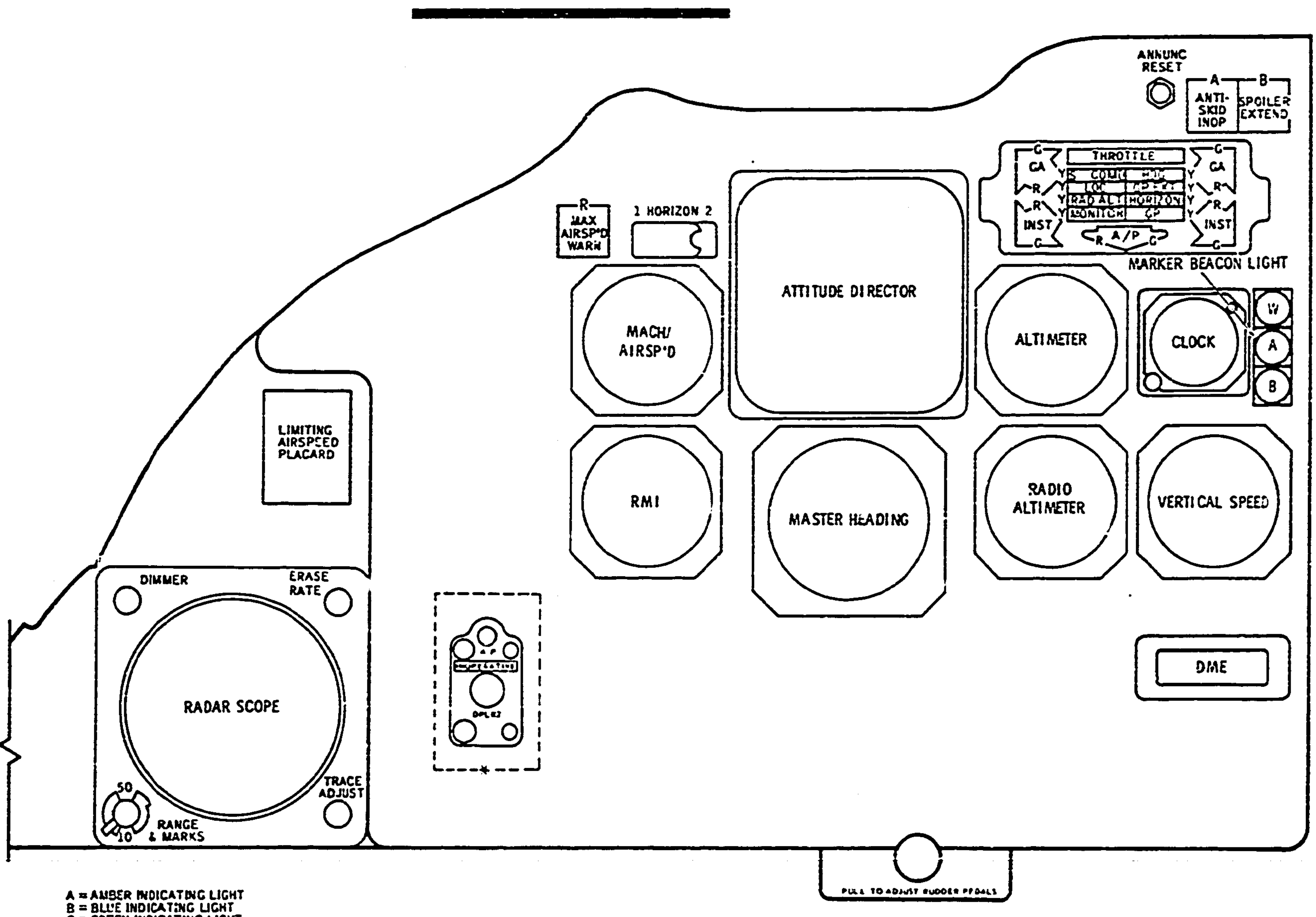
Captain's Flight Instrument Panel
Figure 1



A = AMBER INDICATING LIGHT
R = RED WARNING LIGHT

Captain's Flight Instrument Panel
Figure 1

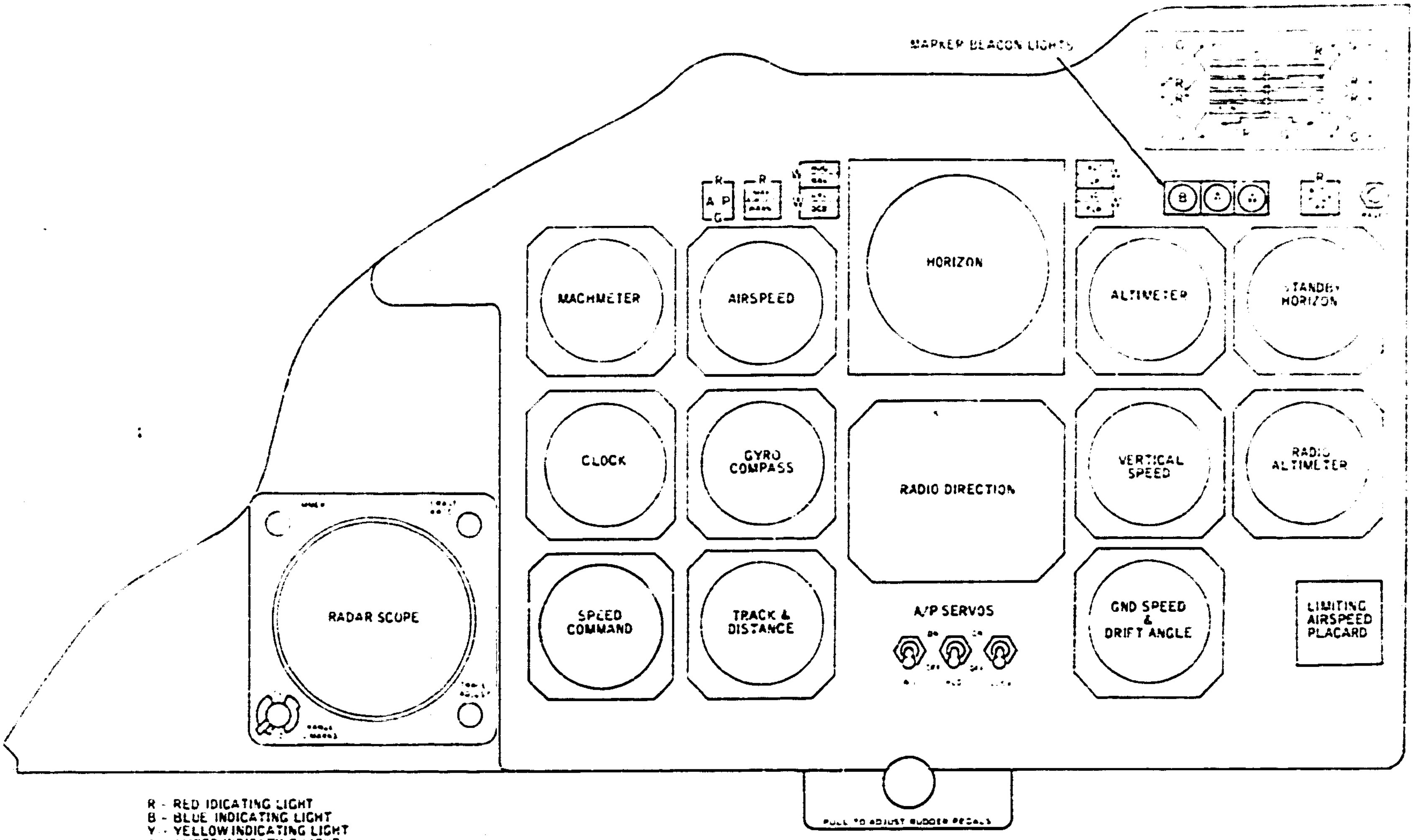
Printed in U.S.A.



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT
R = RED INDICATING LIGHT
W = WHITE INDICATING LIGHT
Y = YELLOW INDICATING LIGHT
* INSTALLED ON N1808E-N1809E

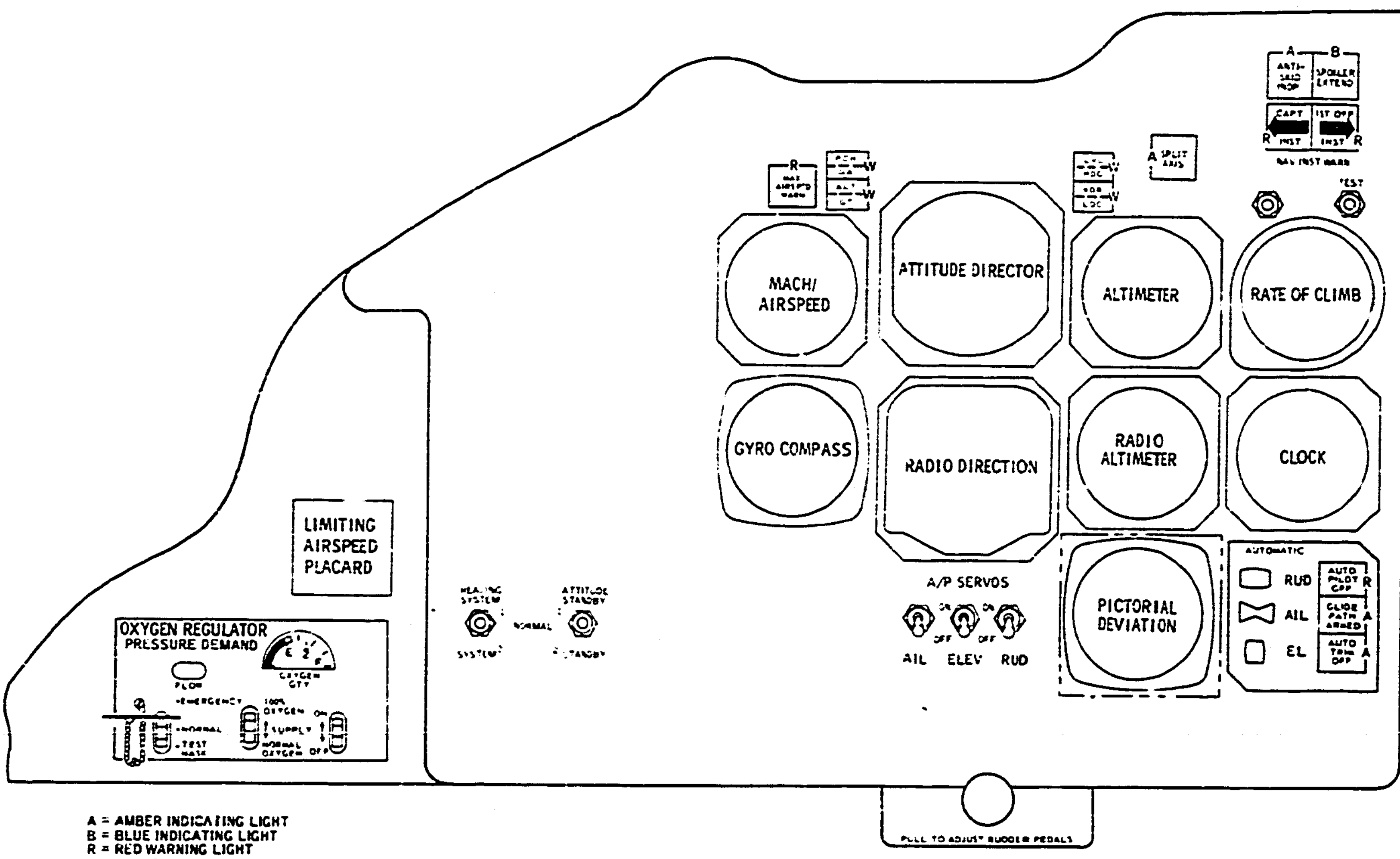
HA2-2897C

Captain's Flight Instrument Panel
Figure 1



R - RED IDICATING LIGHT
B - BLUE INDICATING LIGHT
Y - YELLOW INDICATING LIGHT
A - AMBER INDICATING LIGHT
W - WHITE INDICATING LIGHT
G - GREEN INDICATING LIGHT

Captain's Flight Instrument Panel
Figure 1



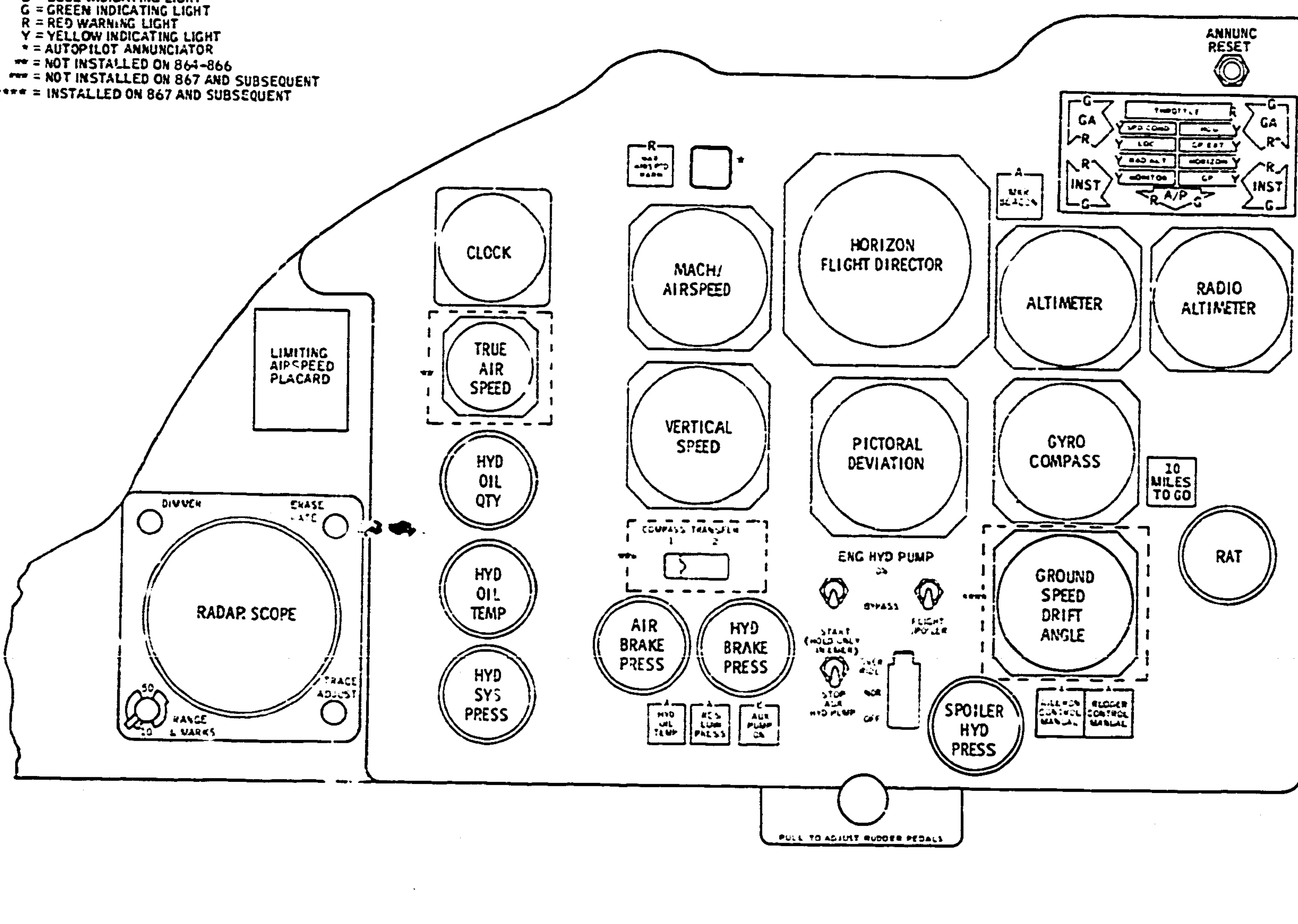
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
W = WHITE INDICATING LIGHT
• INSTALLED ON 1-D1WN, 1-D1WV, 1-D1WC, AND 1-D1WO

HA2-3576C

Captain's Flight Instrument Panel
Figure 1

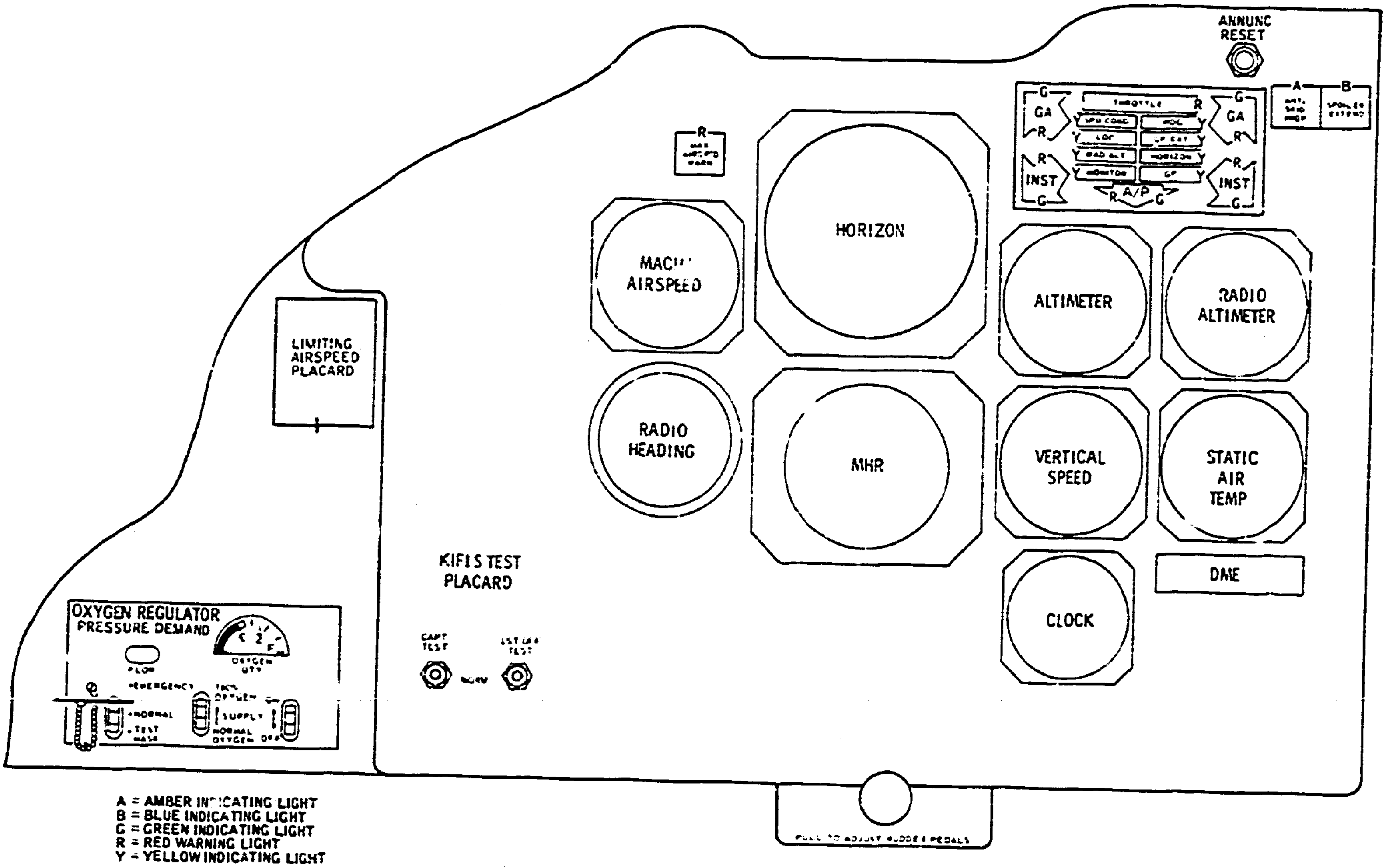
Printed in U.S.A.

A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT
R = RED WARNING LIGHT
Y = YELLOW INDICATING LIGHT
* = AUTOPILOT ANNUNCIATOR
** = NOT INSTALLED ON 864-866
*** = NOT INSTALLED ON 867 AND SUBSEQUENT
**** = INSTALLED ON 867 AND SUBSEQUENT



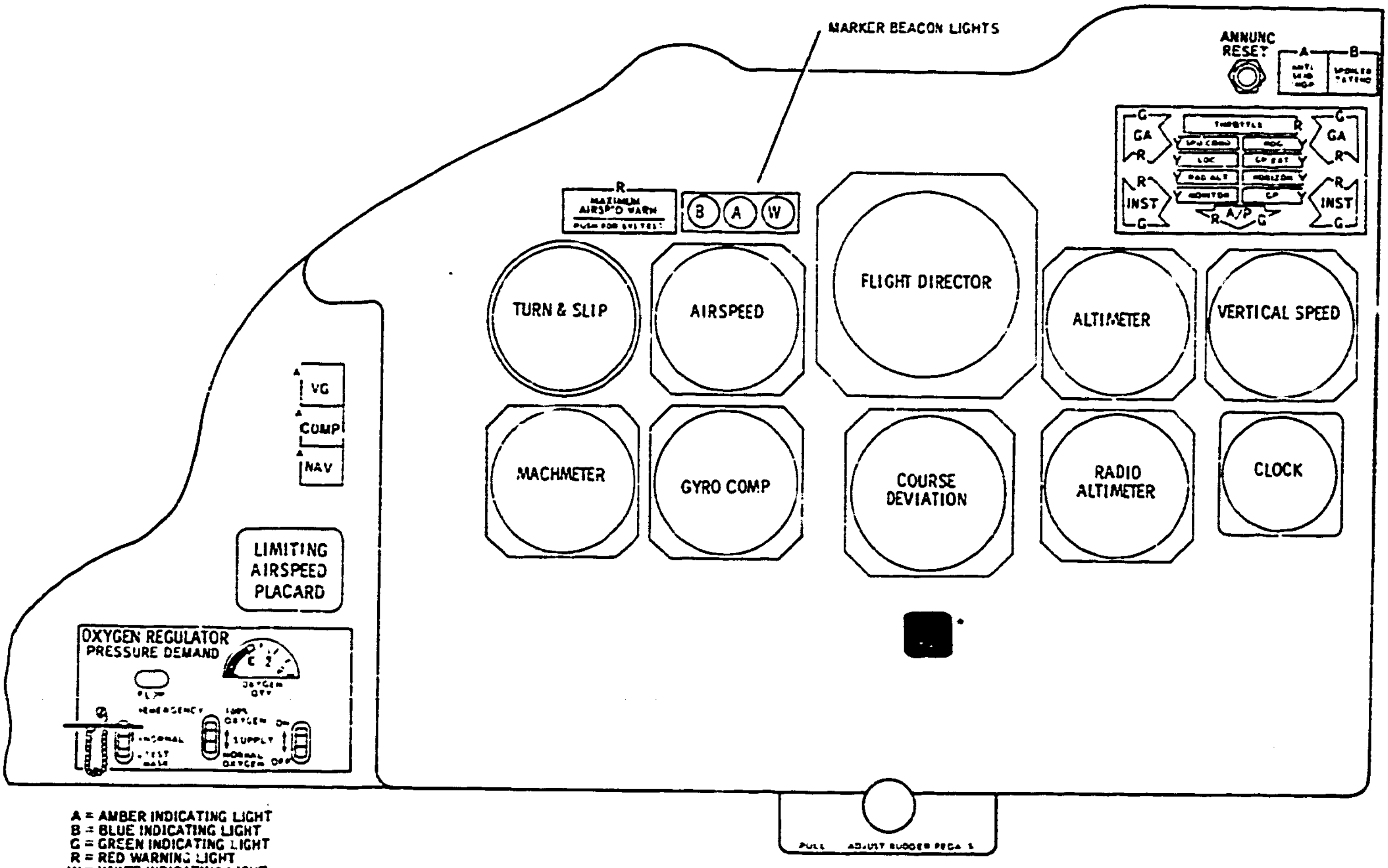
HA2-3596C

Captain's Flight Instrument Panel
Figure 1



HAC J613B

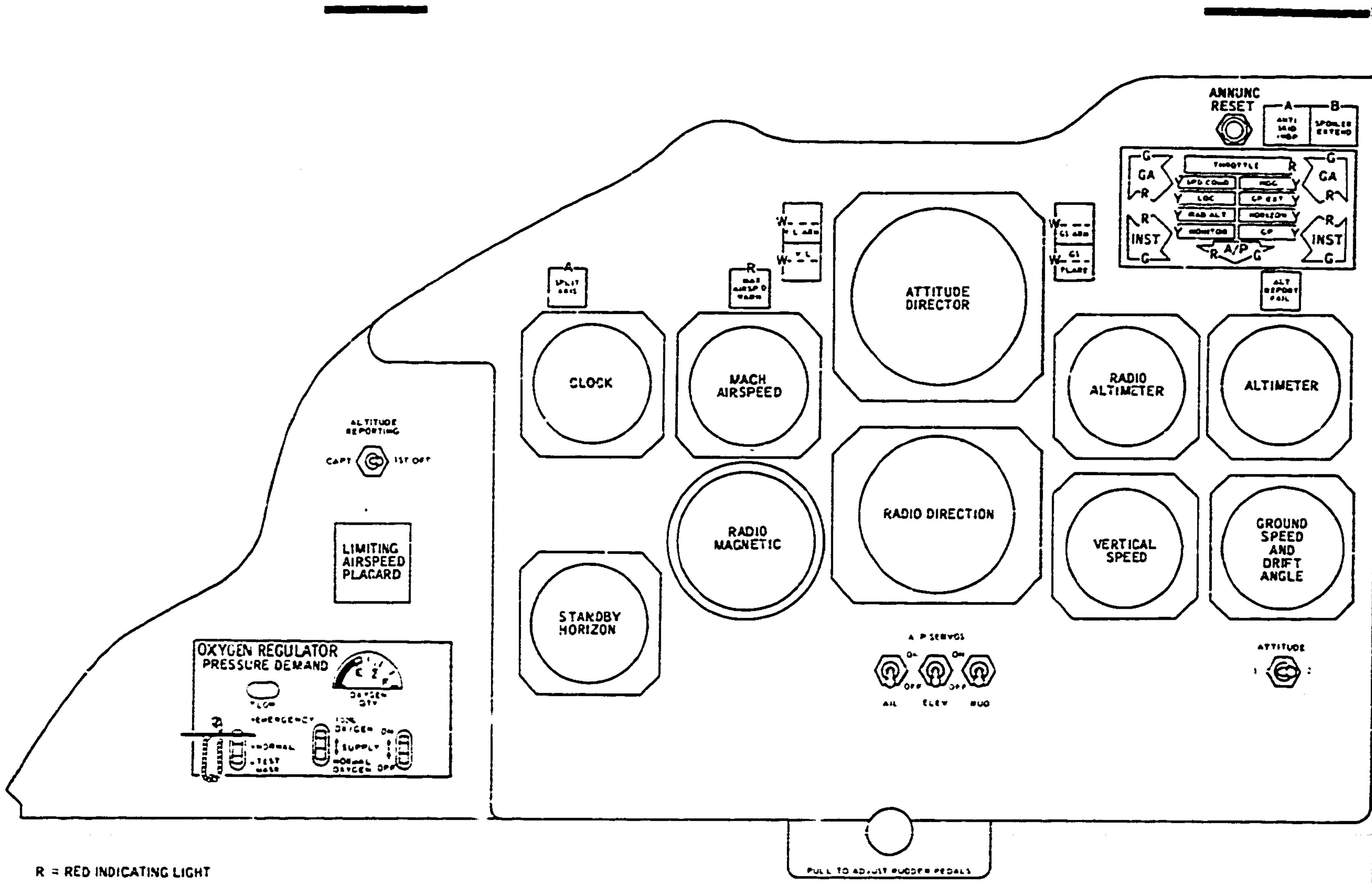
Captian's Flight Instrument Panel
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT
R = RED WARNING LIGHT
W = WHITE INDICATING LIGHT
Y = YELLOW INDICATING LIGHT
* = AUTOPILOT ANNUNCIATOR

HA2-3647

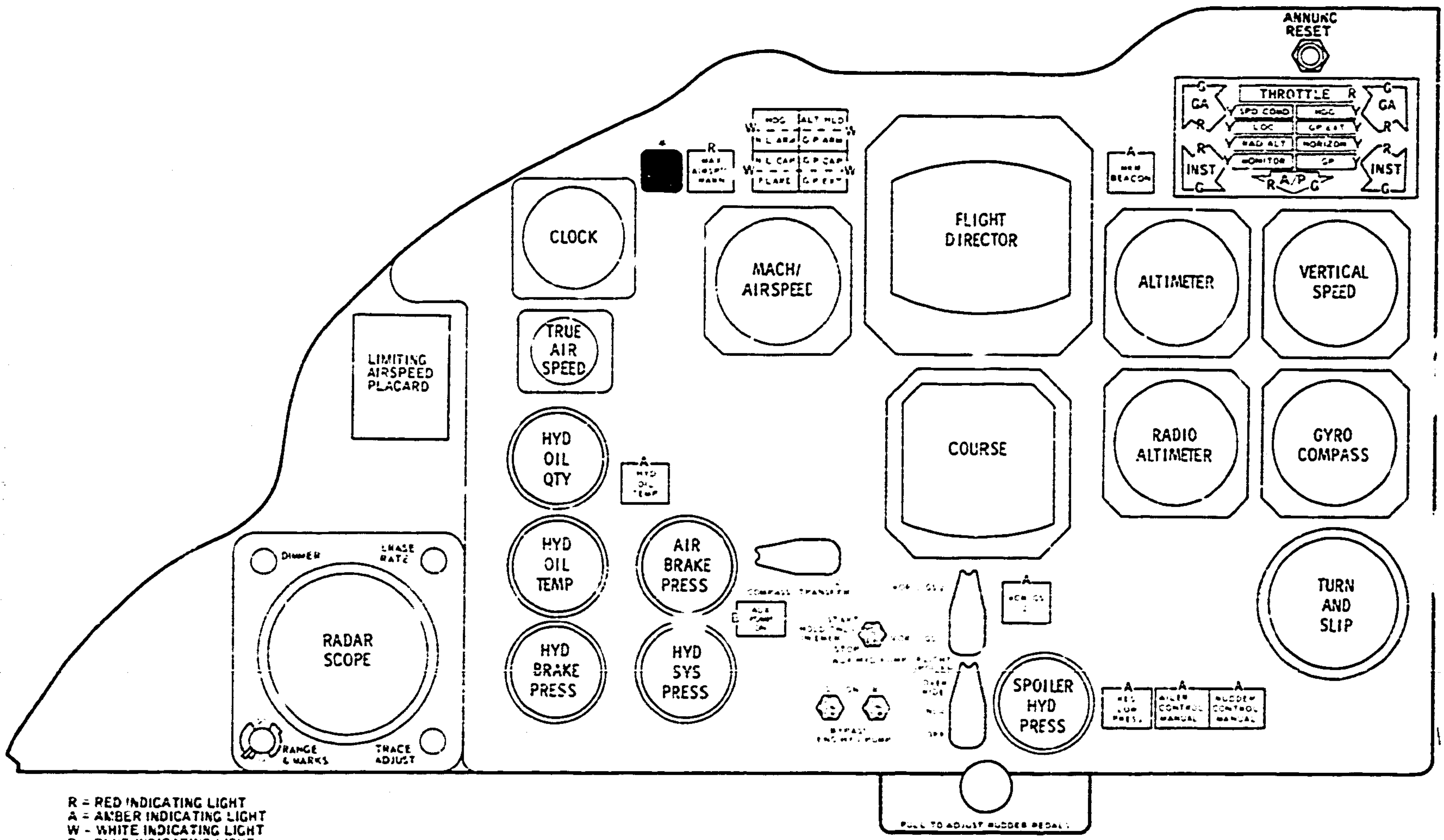
Captain's Instrument Panel
Figure 1



R = RED INDICATING LIGHT
B = BLUE INDICATING LIGHT
Y = YELLOW INDICATING LIGHT
A = AMBER INDICATING LIGHT
W = WHITE INDICATING LIGHT
G = GREEN INDICATING LIGHT

HA2-4145B

Captain's Flight Instrument Panel
Figure 1

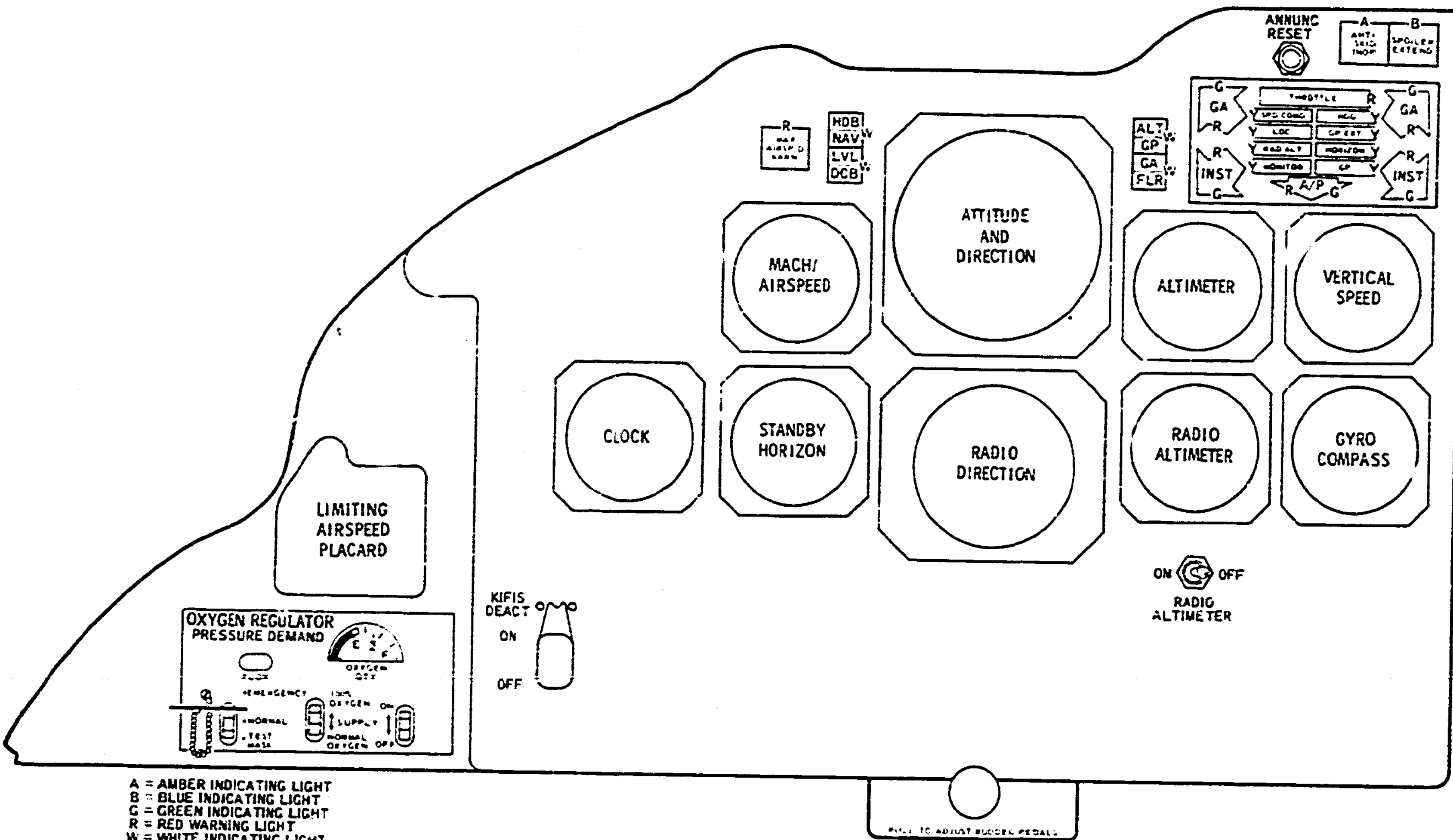


R = RED INDICATING LIGHT
A = AMBER INDICATING LIGHT
W - WHITE INDICATING LIGHT
B - BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT
Y = YELLOW INDICATING LIGHT
* - AUTOPILOT ANNUNCIATOR

HA2-3696A

Captain's Flight Instrument Panel
Figure 1

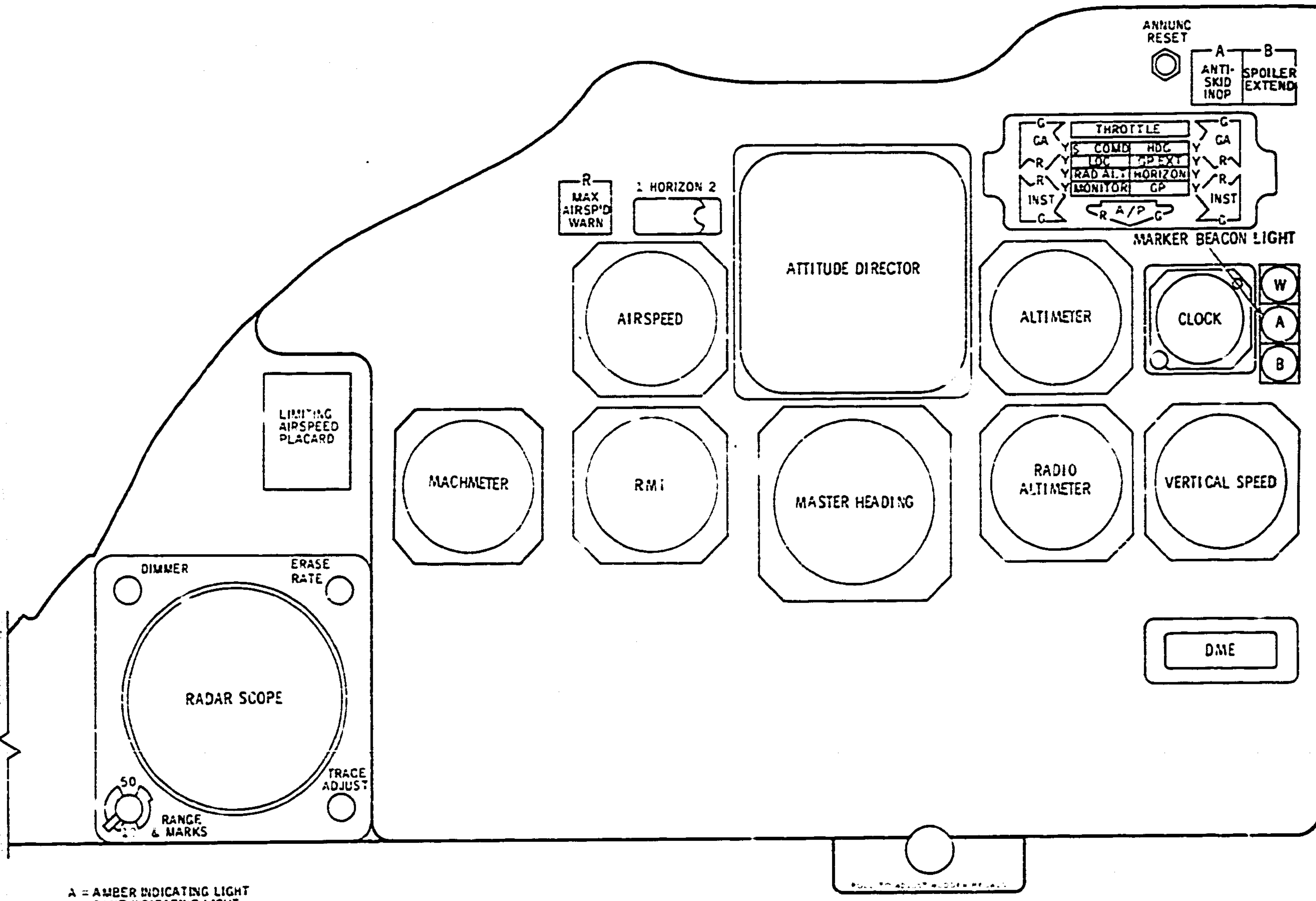
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A = AMBER INDICATING LIGHT
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G = GREEN INDICATING LIGHT
R = RED WARNING LIGHT
W = WHITE INDICATING LIGHT
Y = YELLOW INDICATING LIGHT

HA2-3748A

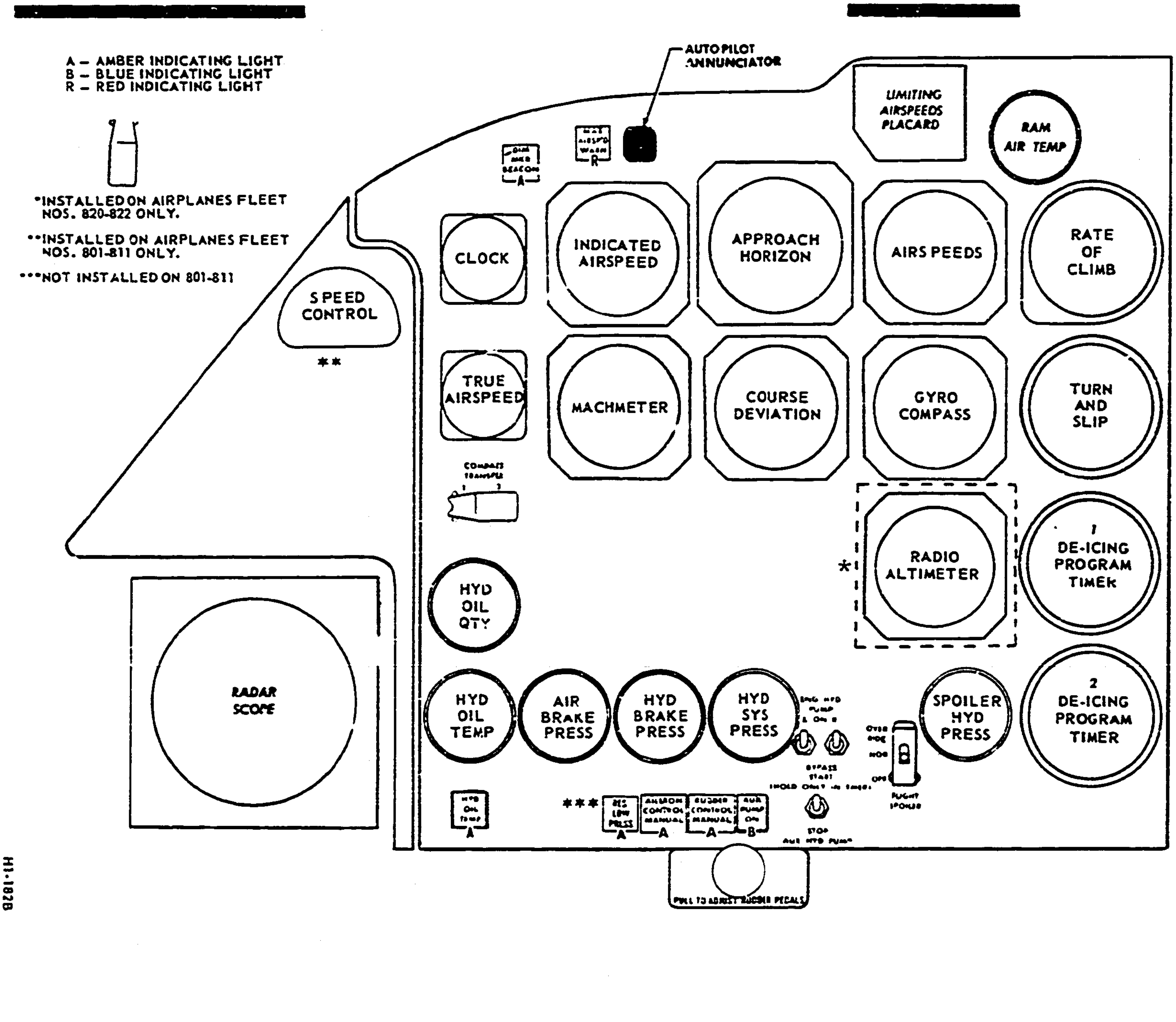
Captain's Flight Insturment Panel
Figure 1



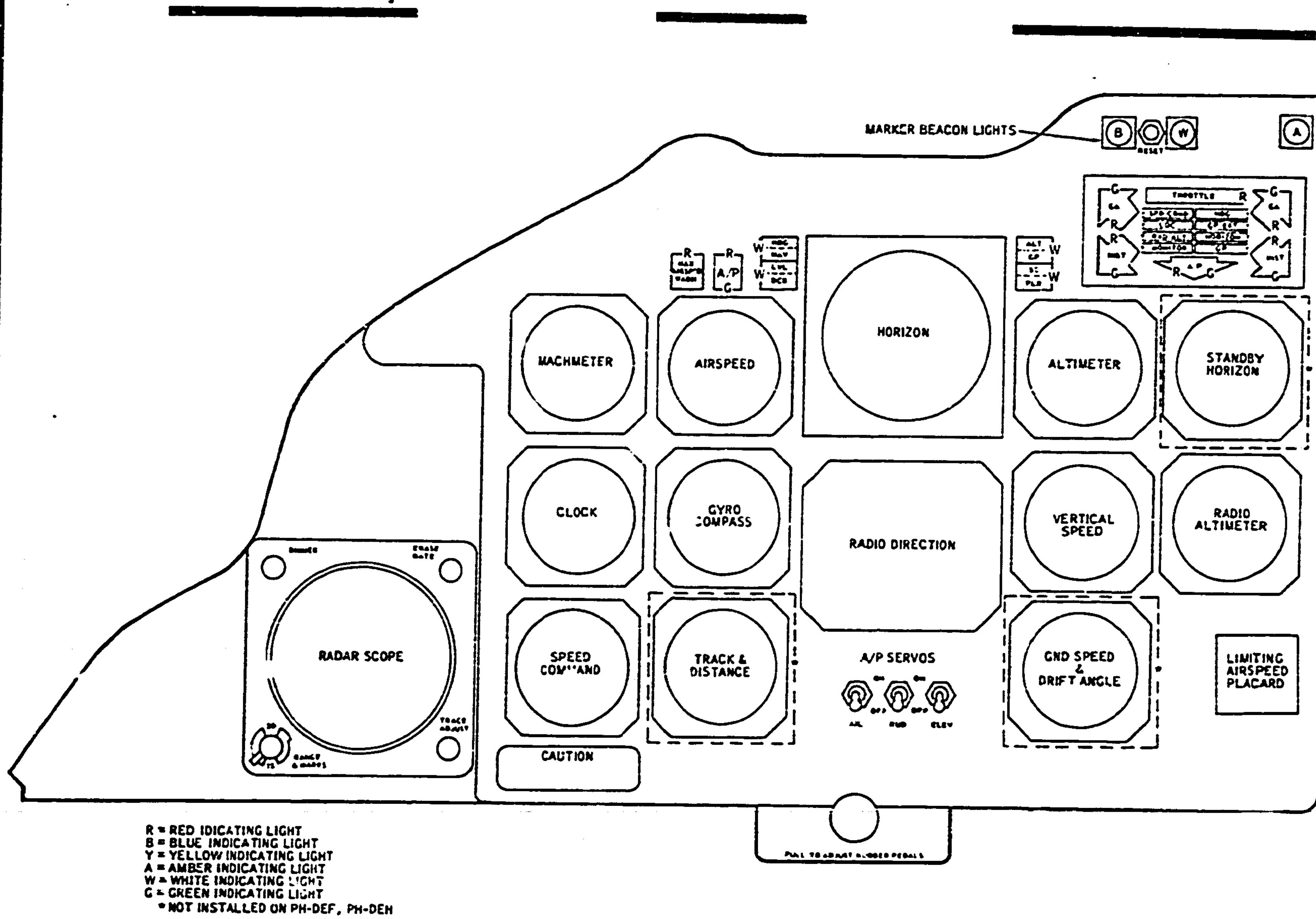
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G = GREEN INDICATING LIGHT
R = RED INDICATING LIGHT
W = WHITE INDICATING LIGHT
Y = YELLOW INDICATING LIGHT

11A2-1222

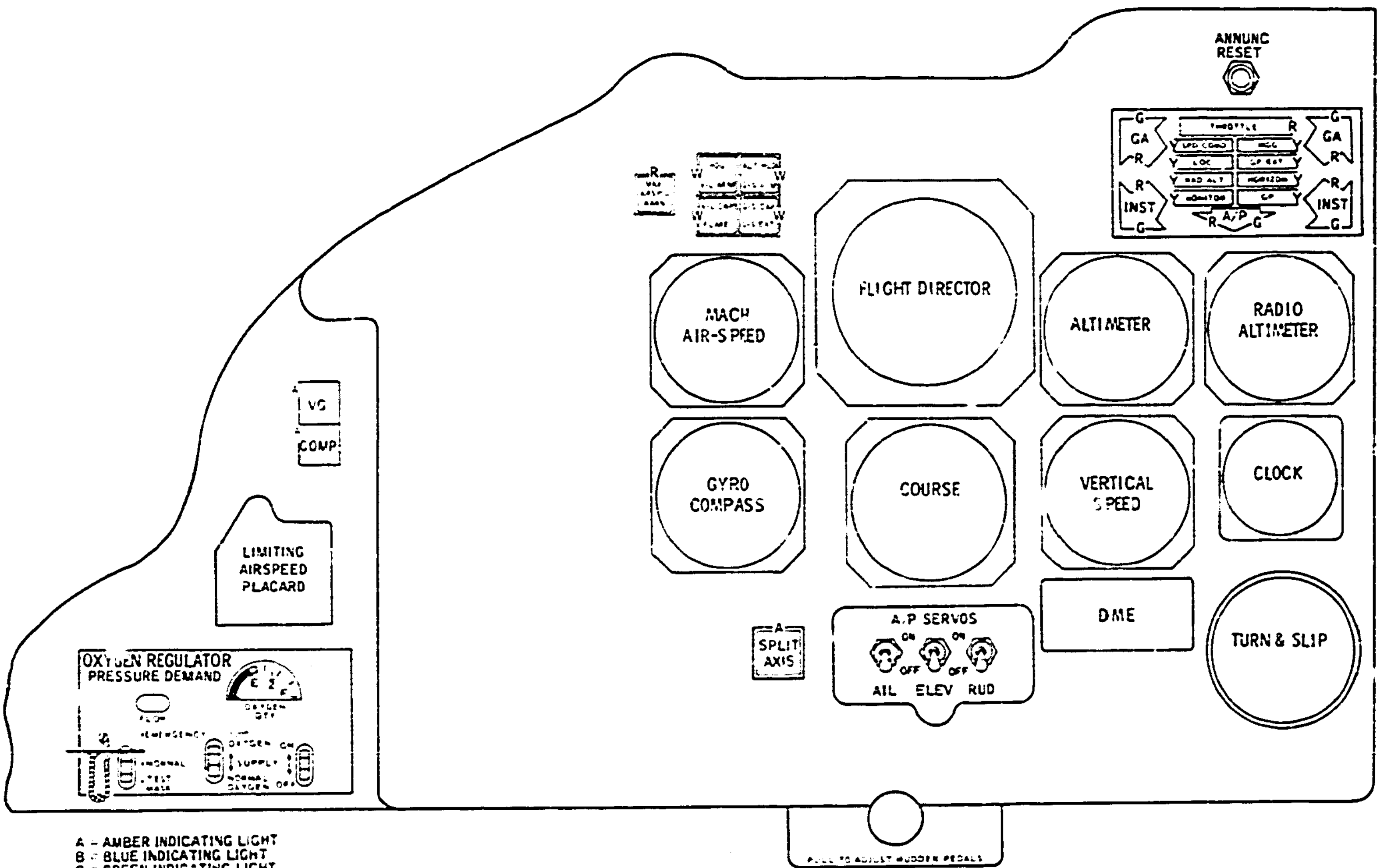
Captain's Flight Instrument Panel
Figure 1



Captain's Flight Instrument Panel
Figure 1



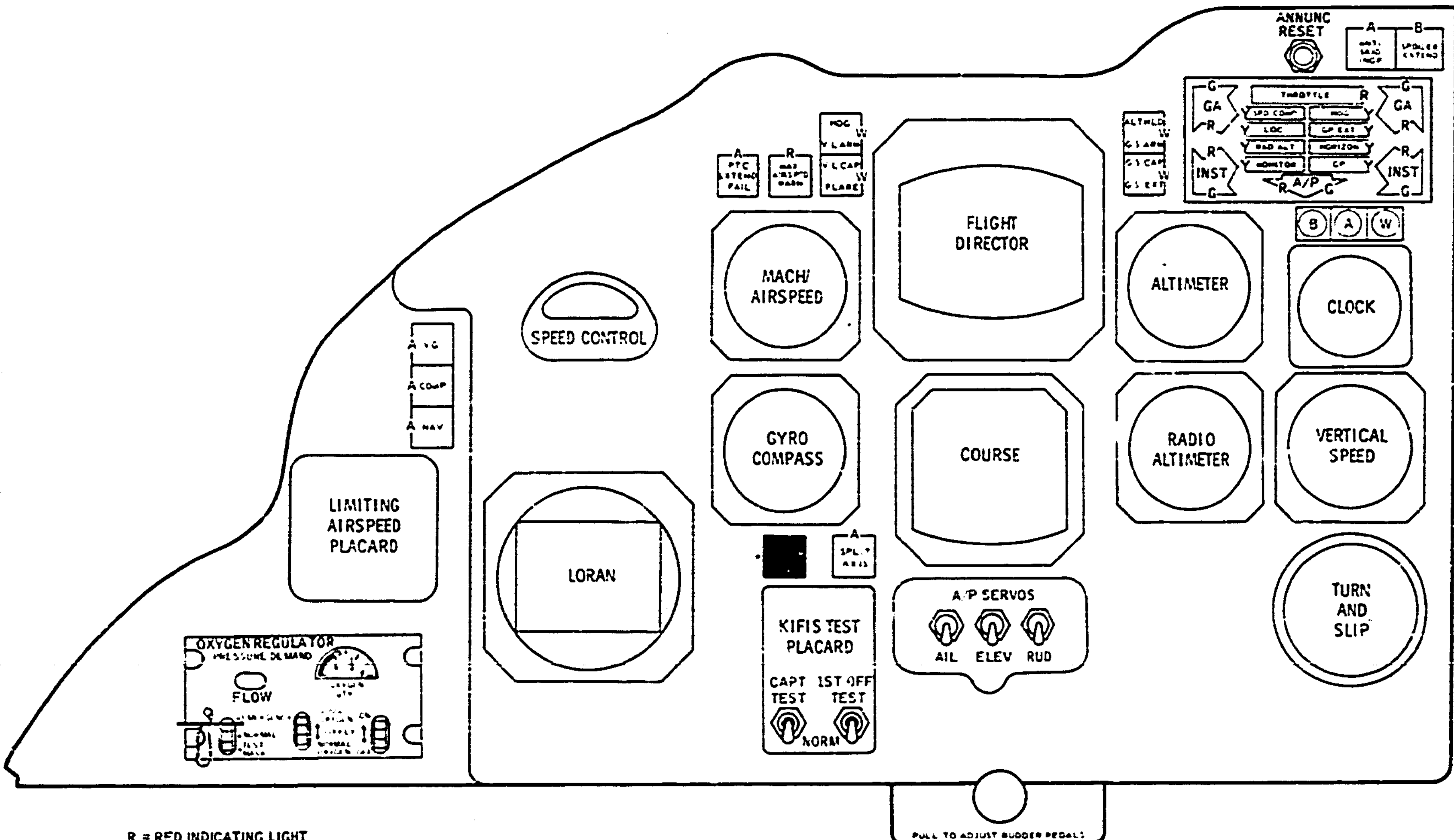
Captain's Flight Instrument Panel
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT
R = RED WARNING LIGHT
W = WHITE INDICATING LIGHT
Y = YELLOW INDICATING LIGHT

HA2-4802

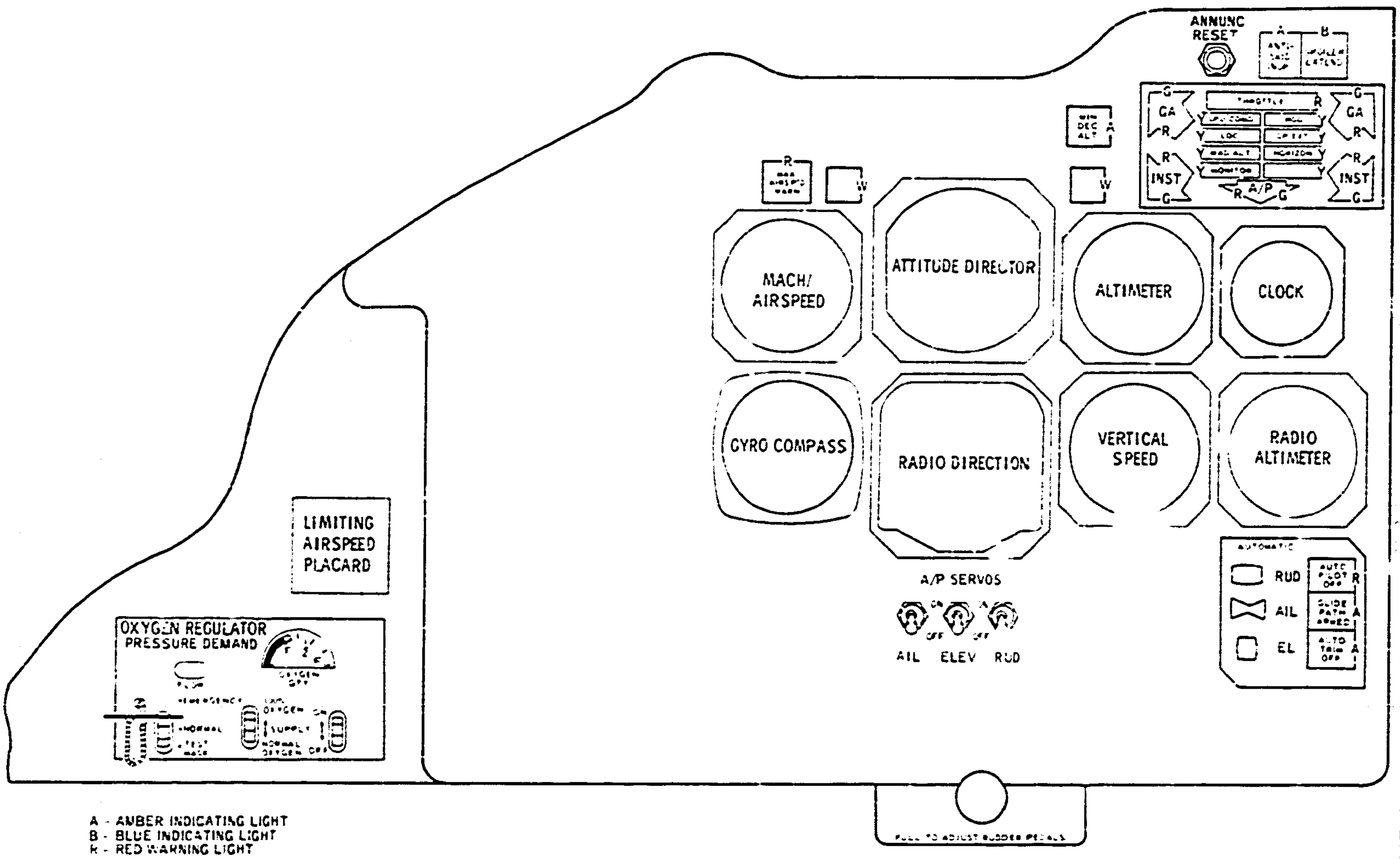
Captain's Flight Instrument Panel
Figure 1



R = RED INDICATING LIGHT
A = AMBER INDICATING LIGHT
W = WHITE INDICATING LIGHT
B = BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT
Y = YELLOW INDICATING LIGHT
* = AUTOPILOT ANNUNCIATOR

HA2-1823

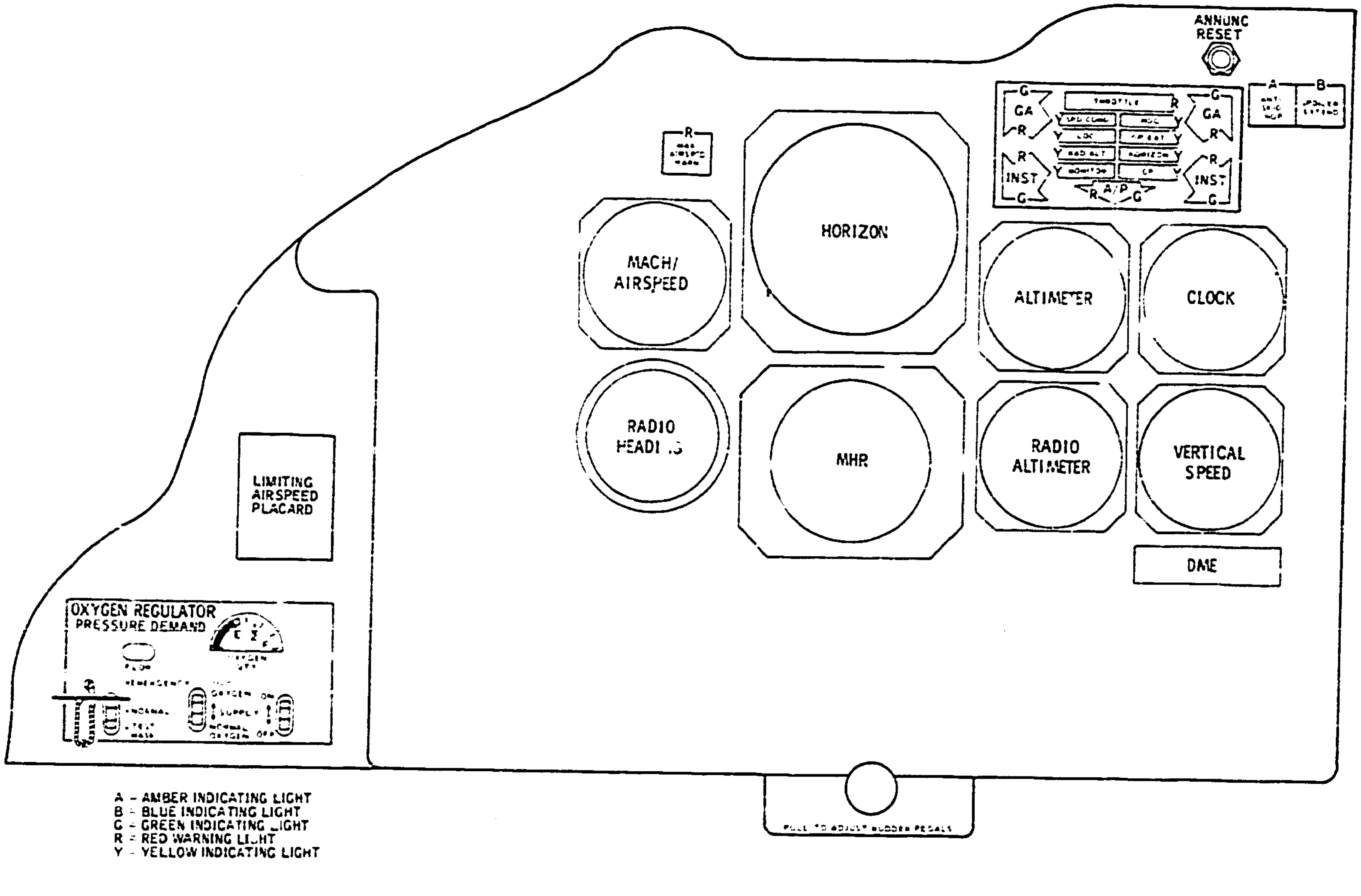
Captain's Flight Instrument Panel
Figure 1



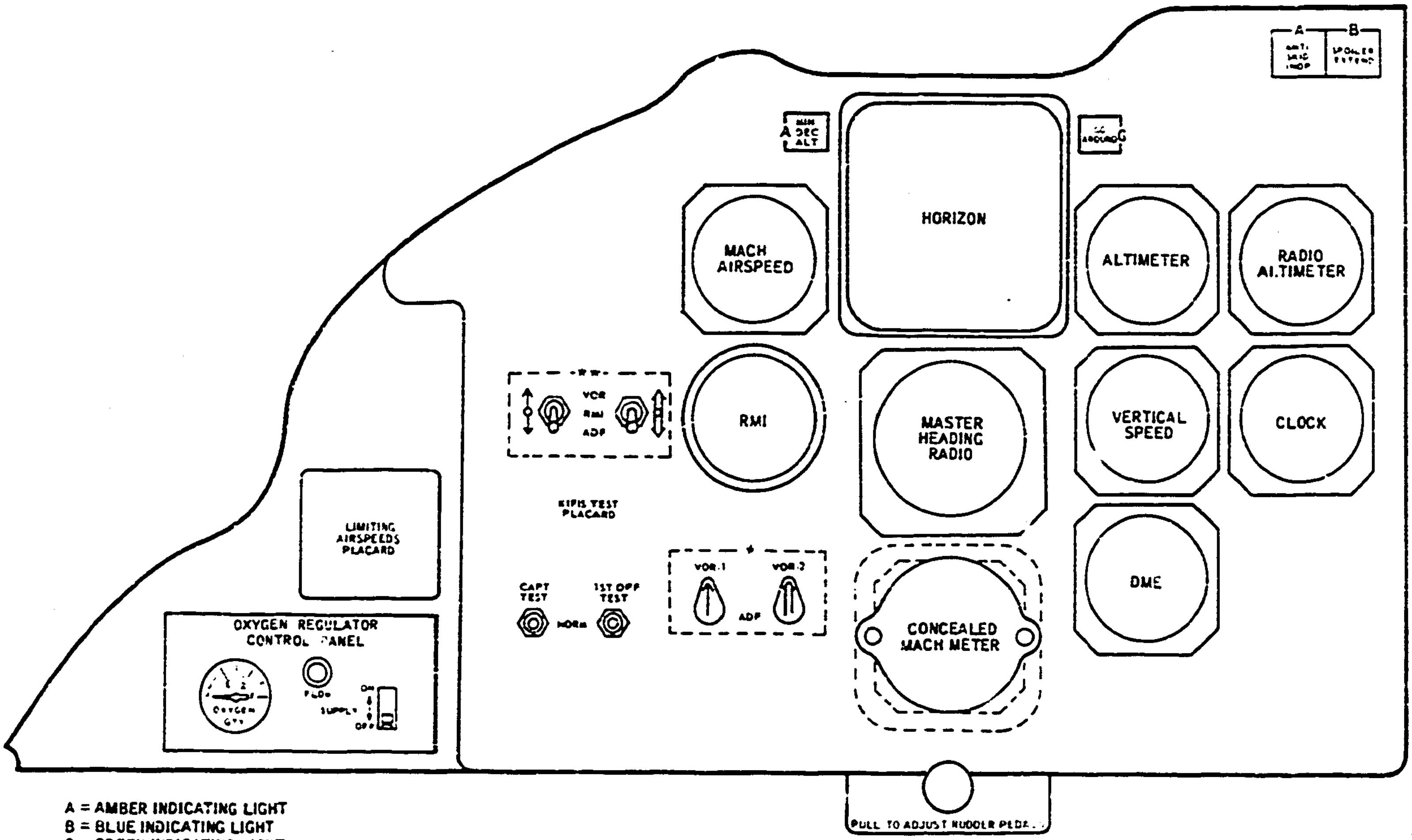
A - AMBER INDICATING LIGHT
B - BLUE INDICATING LIGHT
R - RED WARNING LIGHT
W = WHITE INDICATING LIGHT

1IA2-1804

Captain's Flight Instrument Panel
Figure 1



Captain's Flight Instrument Panel
Figure 1



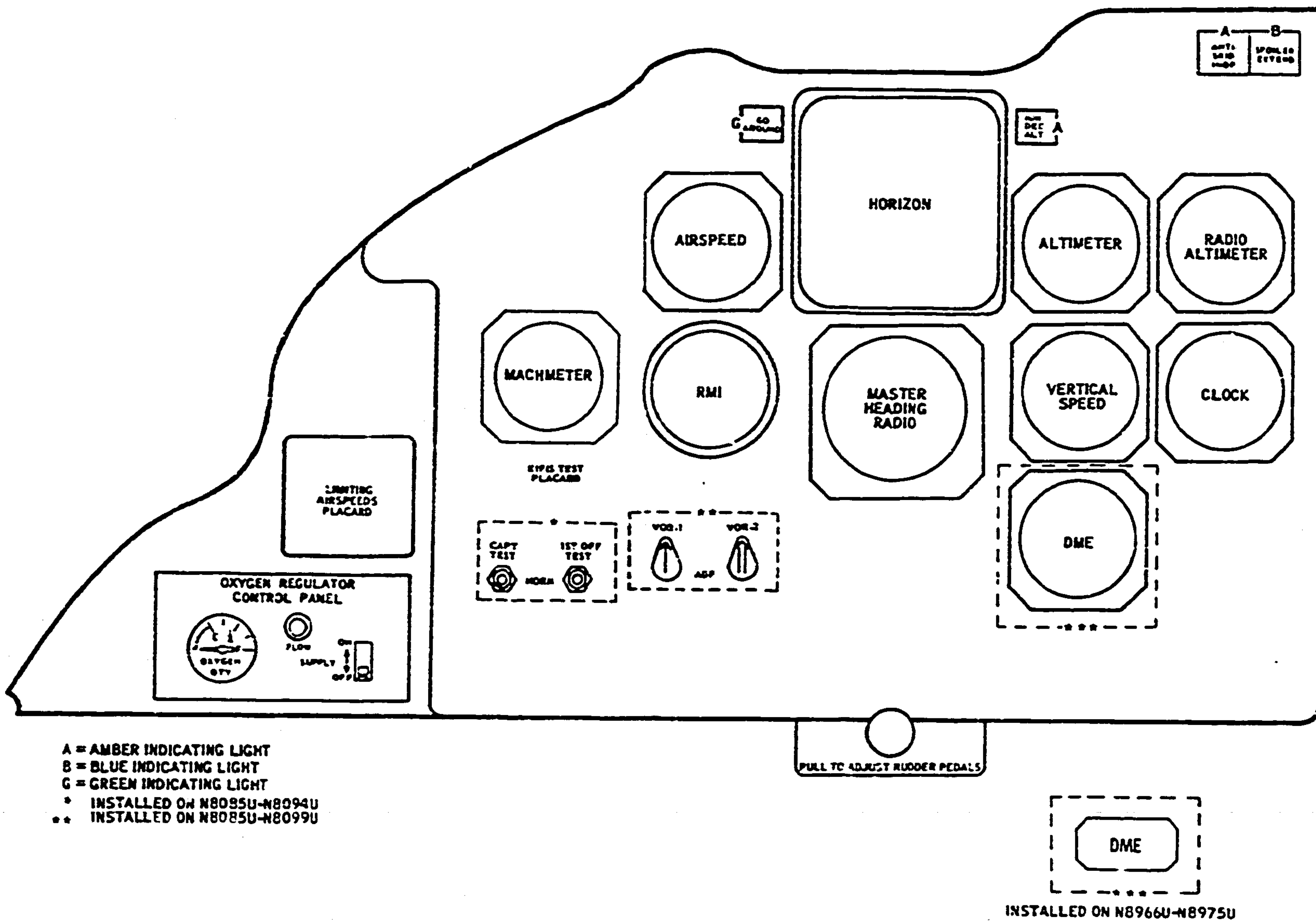
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT

* NOT INSTALLED ON N8070U, N8071U, N8072U, N8073U, N8074U, N8075U, N8076U

** INSTALLED ON N8070U, N8071U, N8072U, N8073U, N8074U, N8075U, N8076U

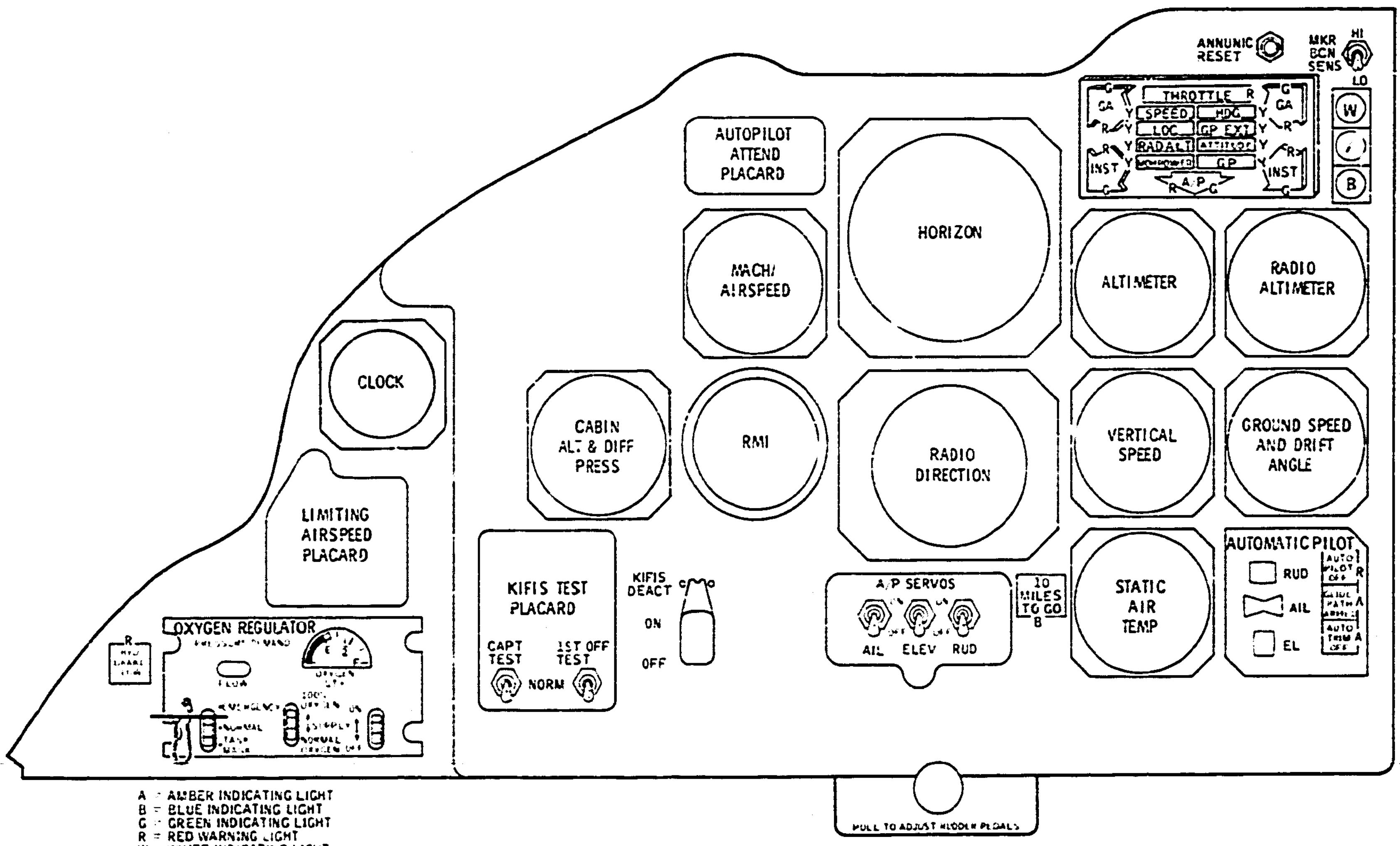
1IA2-1856

Captain's Flight Instrument Panel
Figure 1



HA2-4858C

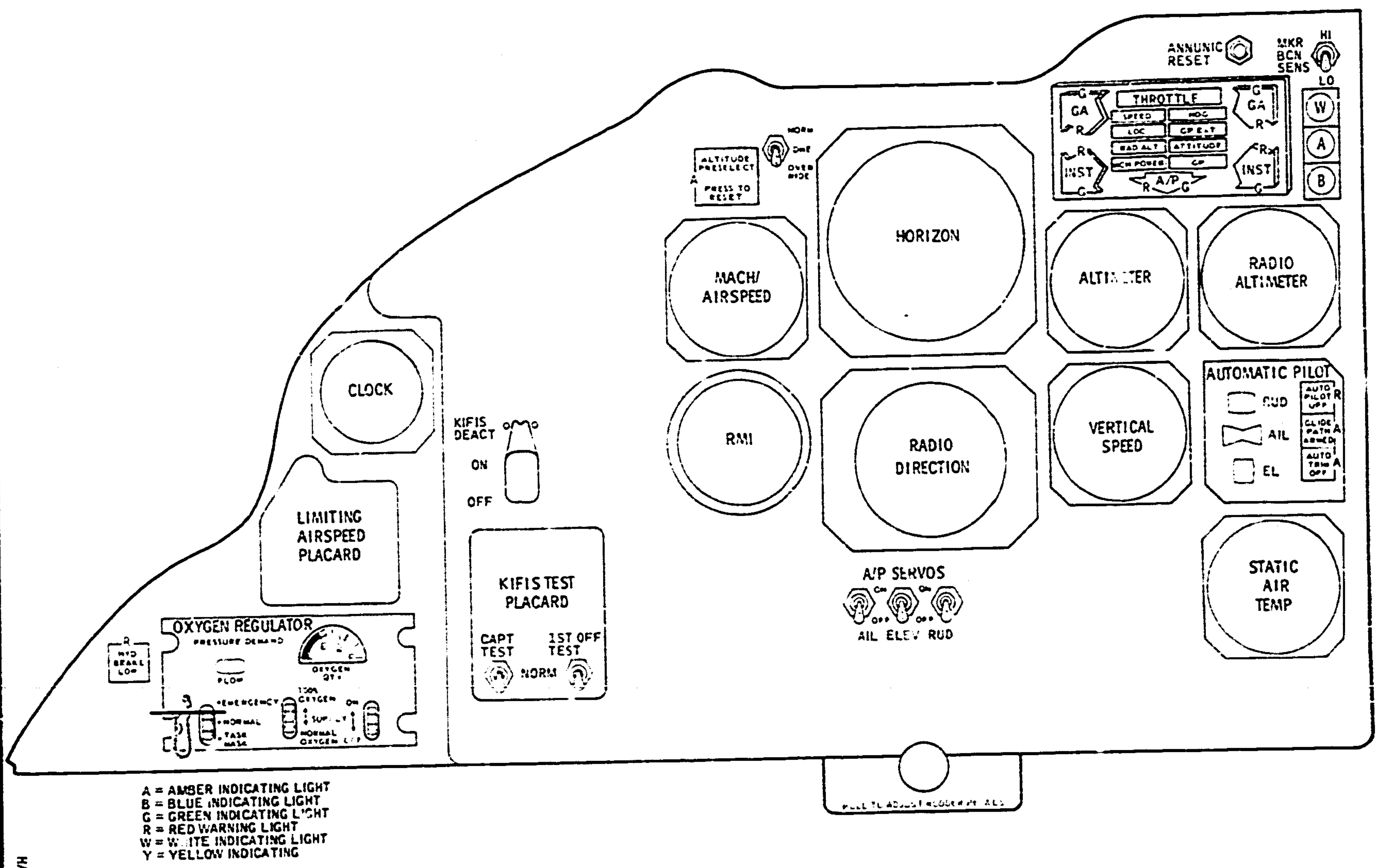
Captain's Flight Instrument Panel
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT
R = RED WARNING LIGHT
W = WHITE INDICATING LIGHT
Y = YELLOW INDICATING LIGHT

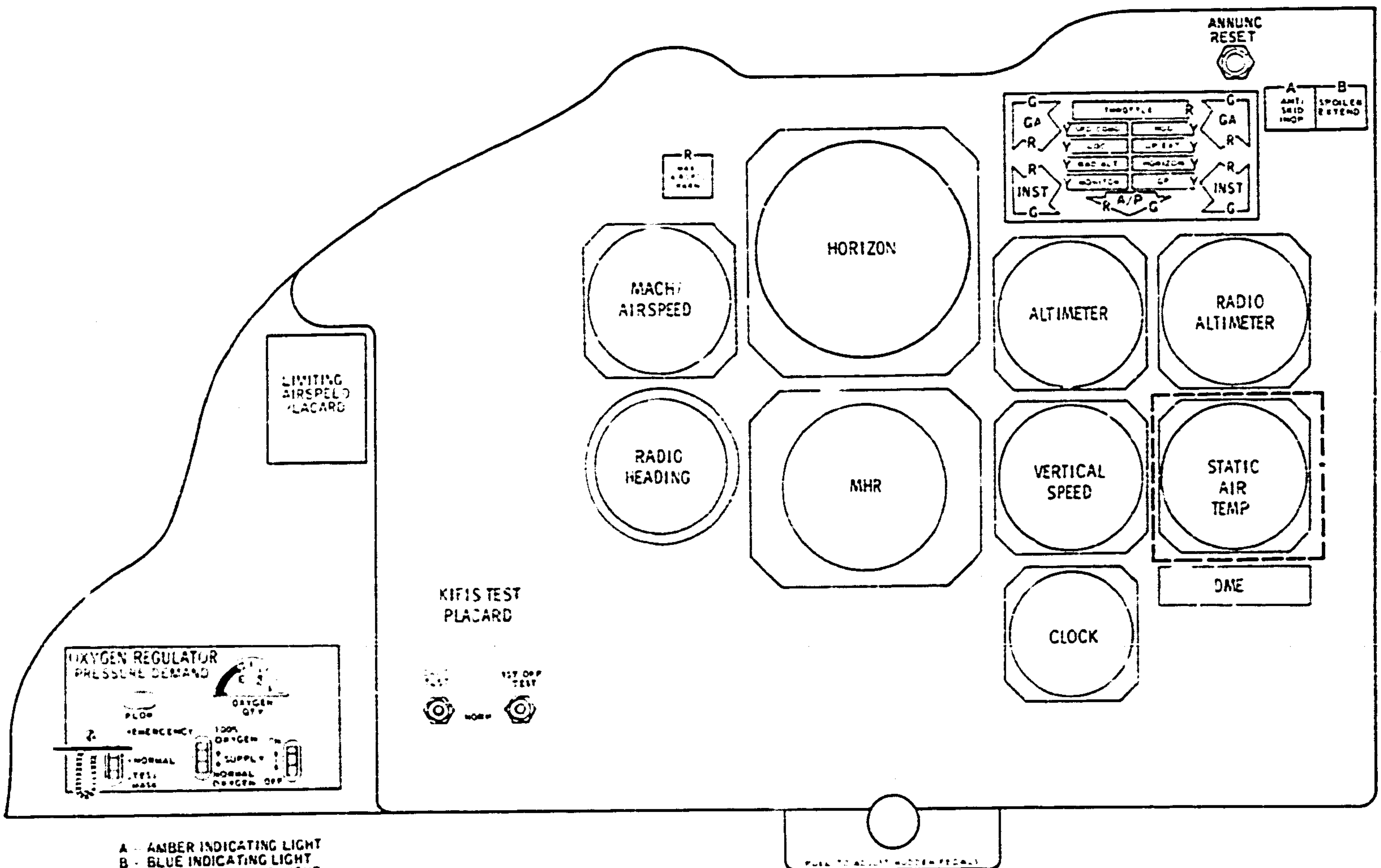
IIA2-4419A

Captain's Flight Instrument Panel
Figure 1



Captain's Flight Instrument Panel
Figure 1

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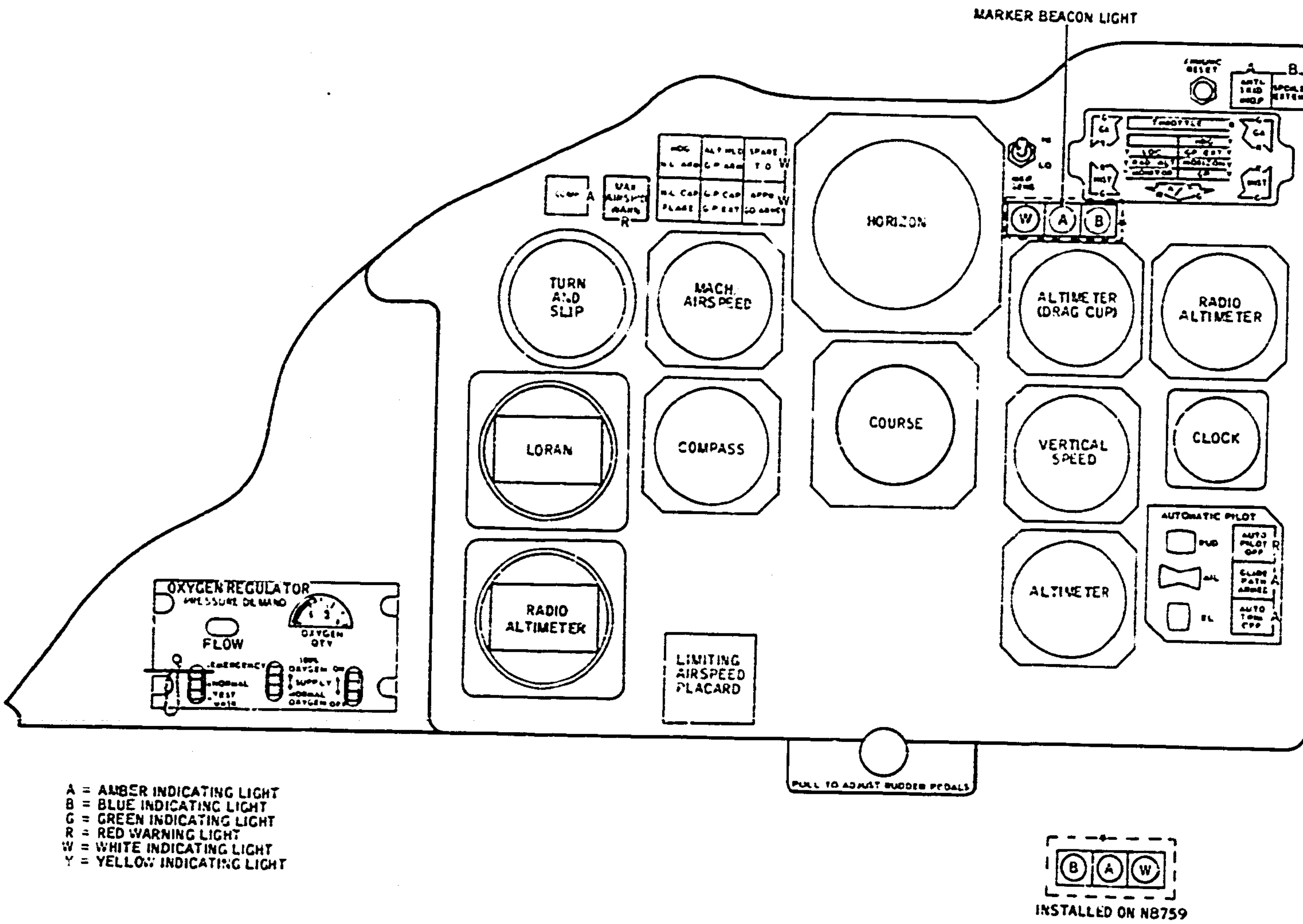


A - AMBER INDICATING LIGHT
B - BLUE INDICATING LIGHT
G - GREEN INDICATING LIGHT
R - RED WARNING LIGHT
Y - YELLOW INDICATING LIGHT
* NOT INSTALLED ON N4863T AND SUBSEQUENT

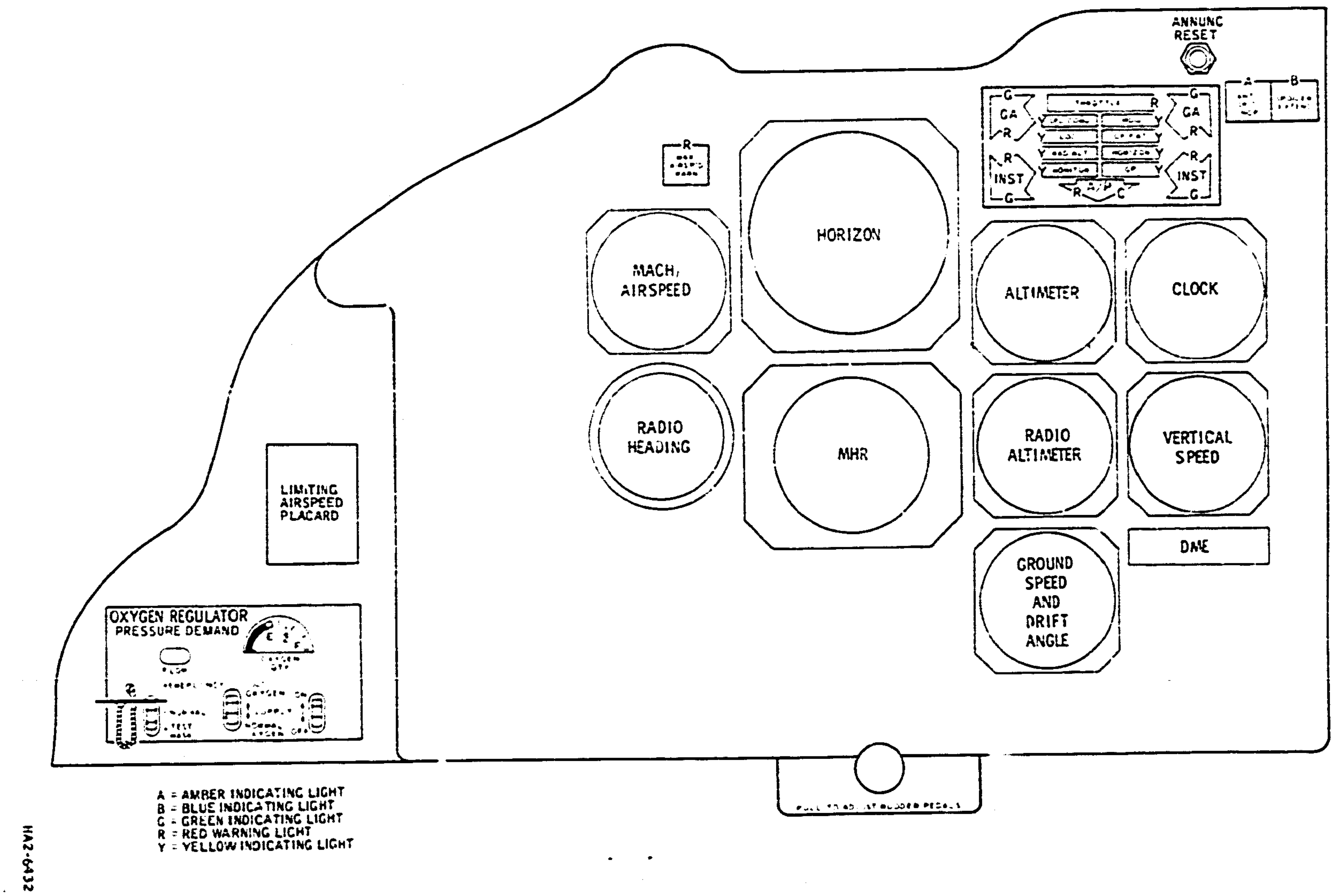
HAZ-5771A

Captain's Flight Instrument Panel
Figure 1

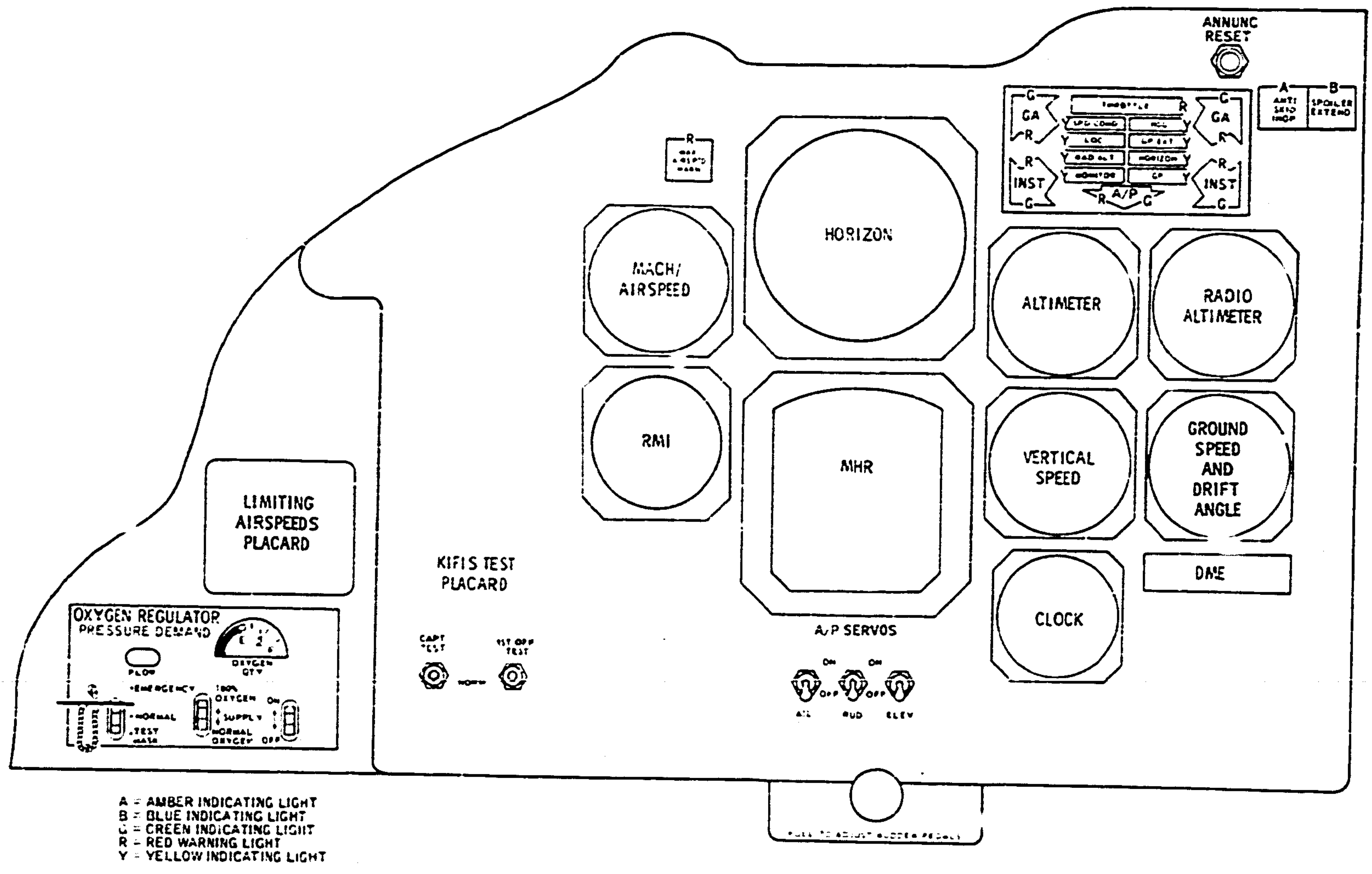
Printed in U.S.A.



Captain's Flight Instrument Panel
Figure 1

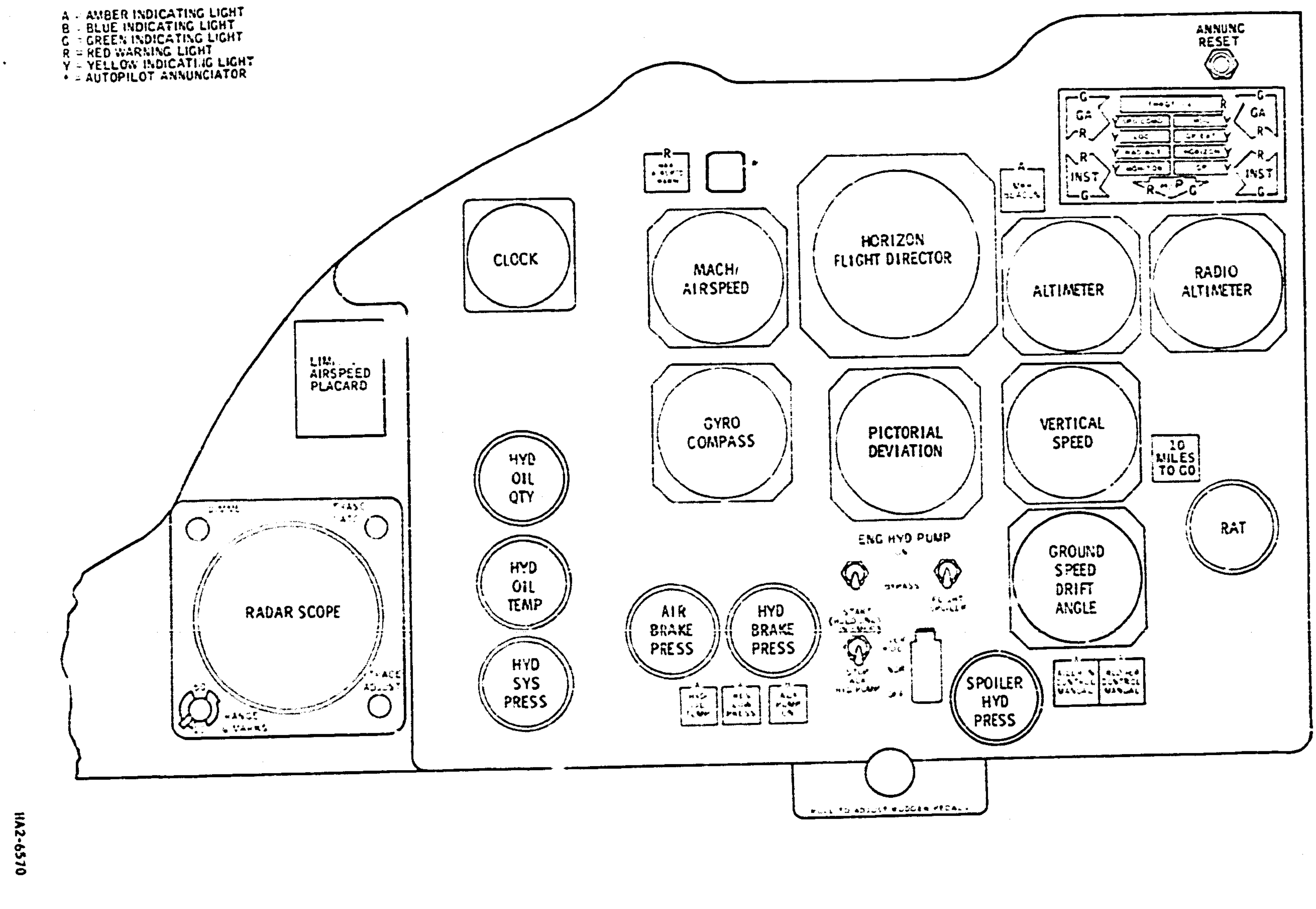


Captain's Flight Instrument Panel
Figure 1

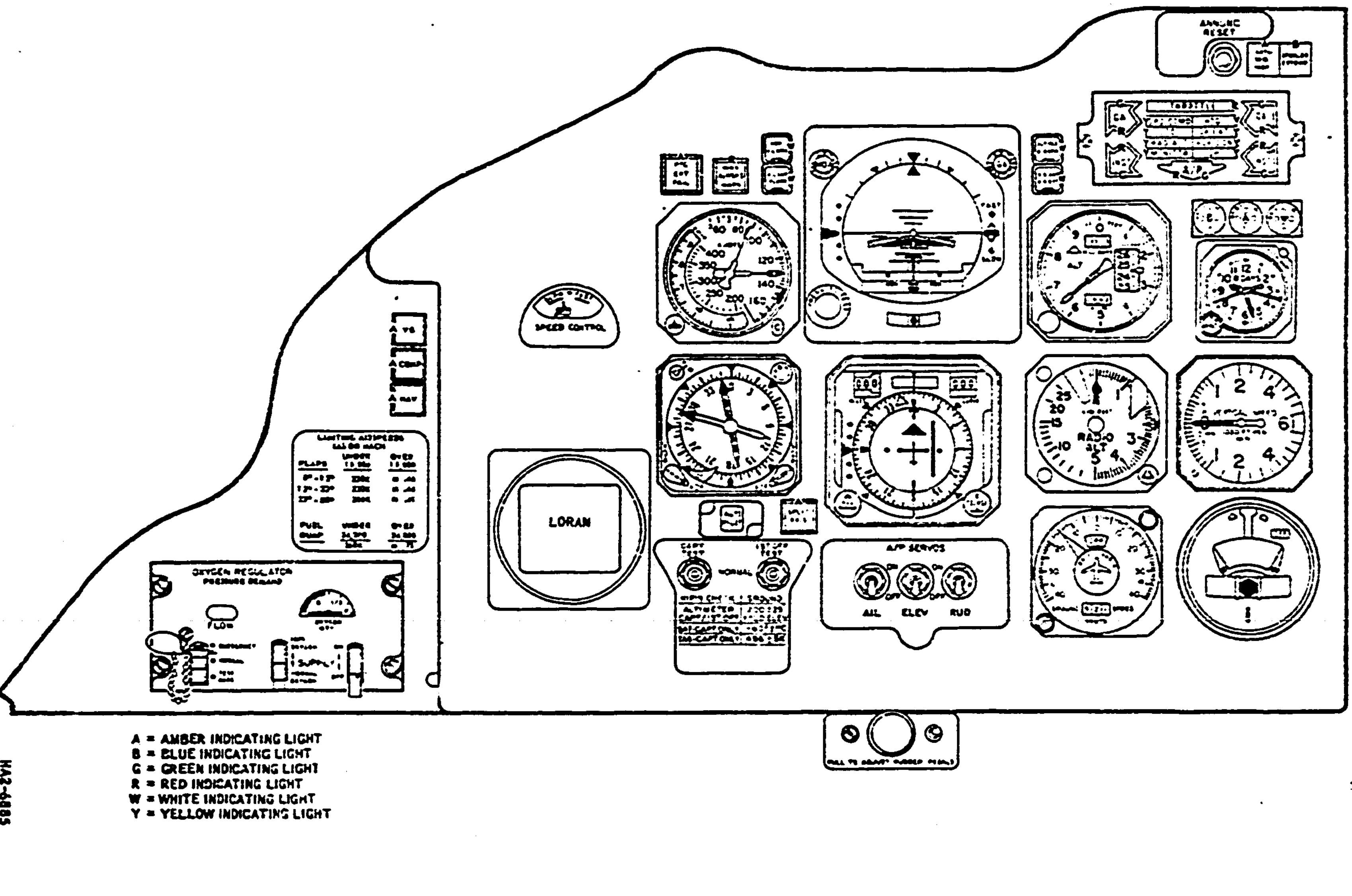


HA2-6460

Captain's Flight Instrument Panel
Figure 1

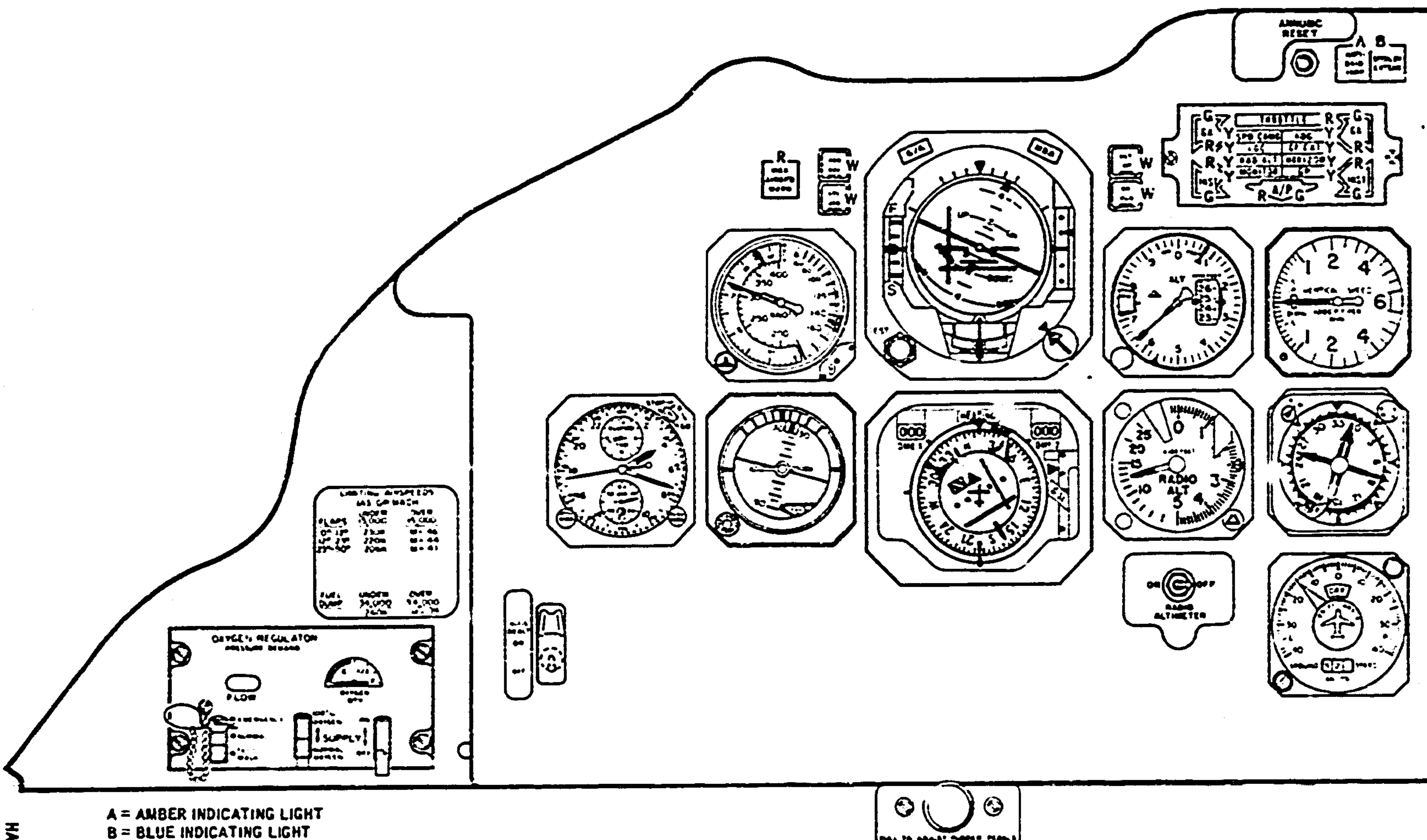


Captain's Flight Instrument Panel
Figure 1



Captain's Flight Instrument Panel
Figure 1

Printed in U.S.A.



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT
R = RED WARNING LIGHT
W = WHITE INDICATING LIGHT
Y = YELLOW INDICATING LIGHT

HA2-7182

Captain's Flight Instrument Panel
Figure 1

CAPTAIN'S FLIGHT INSTRUMENT PANEL - MAINTENANCE PRACTICES

1. General

A. In order to remove the captain's flight instrument panel, it is necessary to remove all power from the airplane and to disconnect all electrical connectors and hoses from the instruments.

B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Captain's Flight Instrument Panel

A. Remove Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

(2) Secure control column in full aft position.

(3) Inspect instruments for properly secured mounting.

(4) Loosen five quick-release fasteners from panel frame.

(5) Tilt panel down.

CAUTION: MAKE CERTAIN THAT AREA IS CLEARED TO PREVENT DAMAGE TO INSTRUMENTS WHEN PANEL IS TILTED DOWN.

(6) Disconnect electrical connectors and lines.

(7) Tag and cap all hoses, ports, and electrical connectors.

(8) Lift panel up.

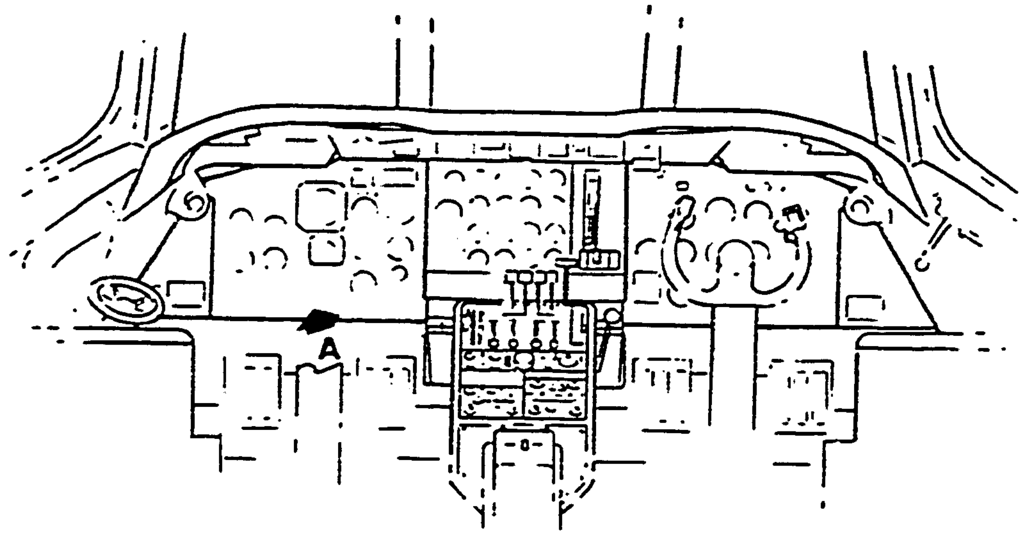
NOTE: The lifting motion shifts the pivot and displaces the bar assembly from the frame.

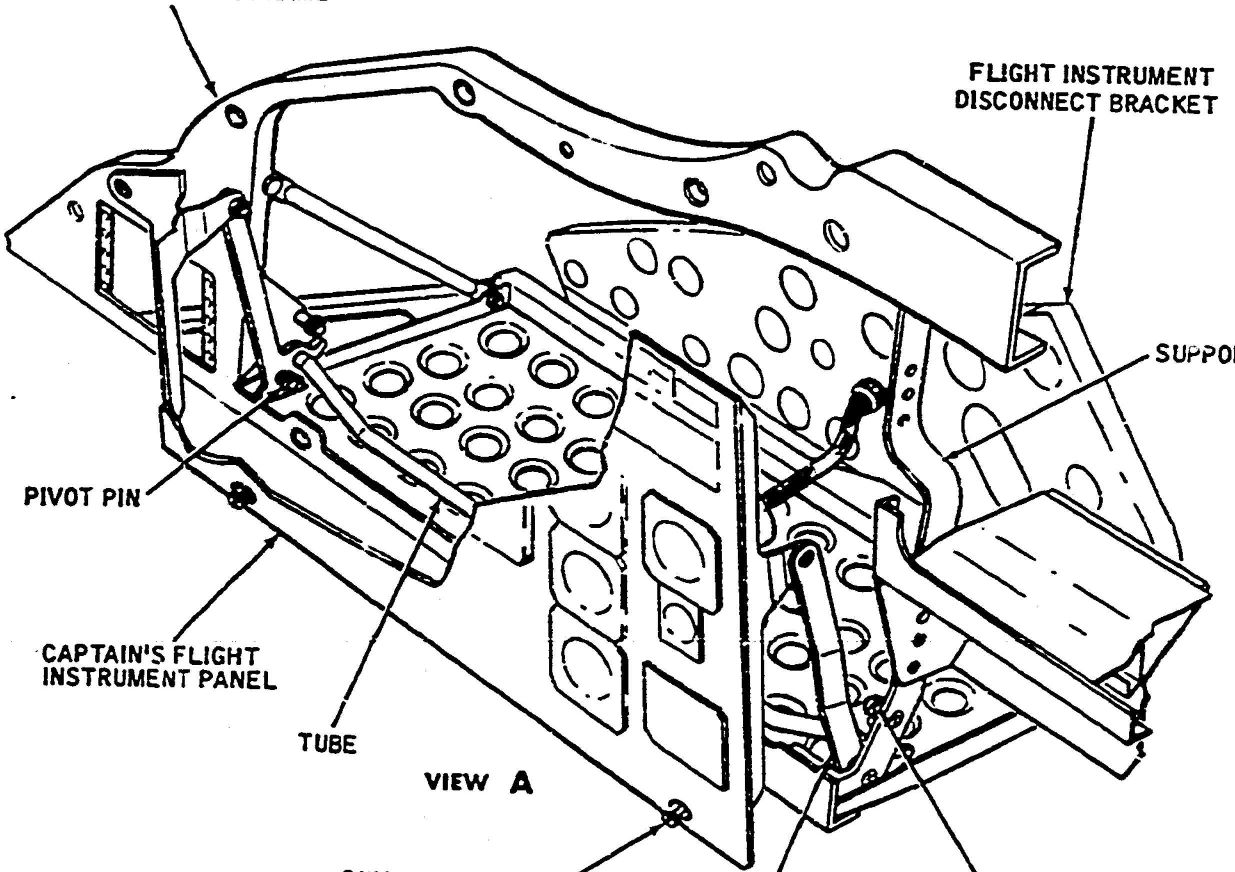
(9) Carefully pull panel aft and remove from cavity.

B. Install Panel

(1) Verify power is removed from airplane.

(2) Check that all indicators are securely clamped in panel.





HA2-1294

Captain's Flight Instrument Panel Replacement
Figure 201

(3) Carefully place panel in cavity, tilted down; slide panel forward and guide bars into frame.

(4) Remove all caps and connect electrical and hose connections.

(5) Swing panel into position, support panel, and secure five quick-release fasteners.

(6) Perform operational test of all systems involved to determine integrity of new installation.

CAPTAIN'S FLIGHT INSTRUMENT PANEL - MAINTENANCE PRACTICES

1. General

A. In order to remove the captain's flight instrument panel, it is necessary to remove all power from the airplane and to disconnect all electrical connectors and hoses from the instruments.

B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Captain's Flight Instrument Panel

A. Remove Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

(2) Secure control column in full aft position.

(3) Make certain that all installed instruments are securely clamped in panel.

(4) Remove spoiler hydraulic pressure indicator before removing panel.

(5) Loosen five quick-release fasteners from panel frame.

(6) Retract the spring-loaded safety latch located on the instrument panel mounting frame above the captain's flight instrument panel.

(7) Tilt panel down until it rests against the stops.

CAUTION: MAKE CERTAIN THAT AREA IS CLEARED TO PREVENT DAMAGE TO INSTRUMENTS WHEN PANEL IS TILTED DOWN.

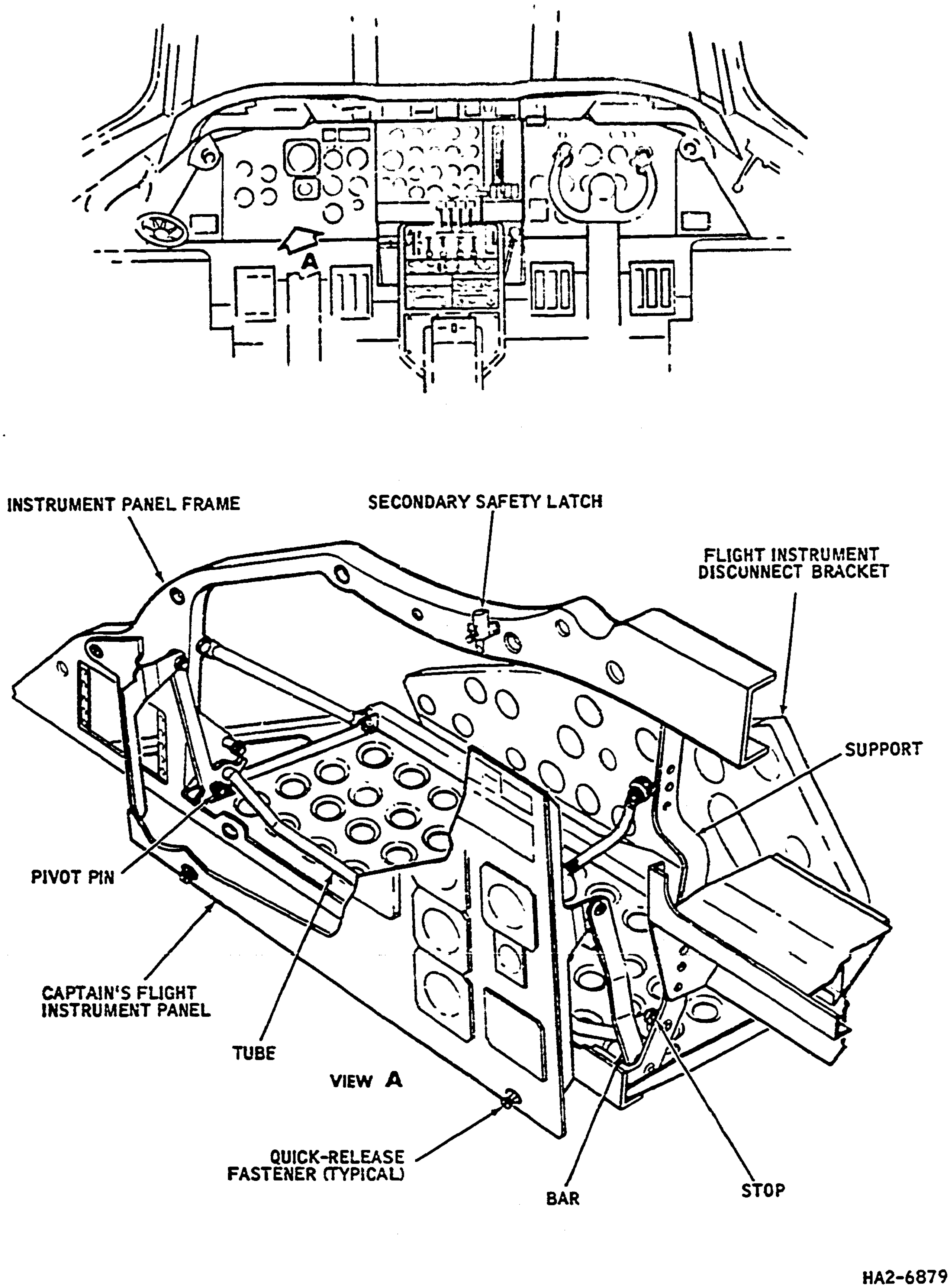
(8) Disconnect electrical connectors and lines.

(9) Tag and cap all hoses, ports, and electrical connectors.

(10) Lift panel up.

NOTE: The lifting motion shifts the pivot and displaces the bar assembly from the frame.

(11) Carefully pull panel aft and remove from cavity.



Captain's Flight Instrument Panel Replacement
Figure 201

B. Install Panel

(1) Verify power is removed from airplane.

(2) Check that all indicators except spoiler hydraulic pressure indicator are securely clamped in panel.

(3) Carefully place panel in cavity, tilted down; slide panel forward and guide bars into frame.

(4) Remove all caps and connect electrical and hose connections.

(5) Retract the spring-loaded safety latch and swing panel into position.

(6) Secure the five quick-release fasteners.

(7) Install spoiler hydraulic pressure indicator.

(8) Perform operational test of all systems involved to determine integrity of new installation.

CAPTAIN'S FLIGHT INSTRUMENT PANEL - MAINTENANCE PRACTICES

1. General

A. In order to remove the captain's flight instrument panel, it is necessary to remove all power from the airplane and to disconnect all electrical connectors and hoses from the instruments.

B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Captain's Flight Instrument Panel

A. Remove Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

(2) Secure control column in full aft position.

(3) Make certain that all installed instruments are securely clamped in panel.

(4) Loosen five quick-release fasteners from panel frame.

(5) Depress the hinged safety stop located on glareshield.

(6) Tilt panel down.

CAUTION: MAKE CERTAIN THAT AREA IS CLEARED TO PREVENT DAMAGE TO INSTRUMENTS WHEN PANEL IS TILTED DOWN.

(7) Disconnect electrical connectors and lines.

(8) Tag and cap all hoses, ports, and electrical connectors.

(9) Lift panel up and disengage pin-and-slotted-hook supports at each side of the panel cavity.

NOTE: The lifting motion shifts the pivot and displaces the bar assembly from the frame.

(10) Carefully pull panel aft and remove from cavity.

B. Install Panel

(1) Verify power is removed from airplane.

(2) Check that all indicators are securely clamped in panel.

(3) Carefully place panel in cavity, tilted down. Slide panel forward and engage pin-and-slotted-hook supports.

(4) Remove all caps and connect electrical and hose connections.

(5) Depress hinged safety stop on glareshield and swing panel into position.

(6) Support panel, and secure five quick-release fasteners.

(7) Perform operational test of all systems involved to determine integrity of new installation.

CAPTAIN'S FLIGHT INSTRUMENT PANEL - MAINTENANCE PRACTICES

1. General

A. In order to remove the captain's flight instrument panel, it is necessary to remove all power from the airplane and to disconnect all electrical connectors and hoses from the instruments.

B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Captain's Flight Instrument Panel

A. Remove Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

(2) Secure control column in full aft position.

(3) Make certain that all installed instruments are securely clamped in panel.

(4) Loosen five quick-release fasteners from panel frame.

(5) Retract the spring-loaded safety latch located on the instrument panel mounting frame, above the captain's flight instrument panel.

(6) Tilt panel down until it rests against the stops.

CAUTION: MAKE CERTAIN THAT AREA IS CLEARED TO PREVENT DAMAGE TO INSTRUMENTS WHEN PANEL IS TILTED DOWN.

(7) Disconnect electrical connectors and lines.

(8) Tag and cap all hoses, ports, and electrical connectors.

(9) Lift panel up.

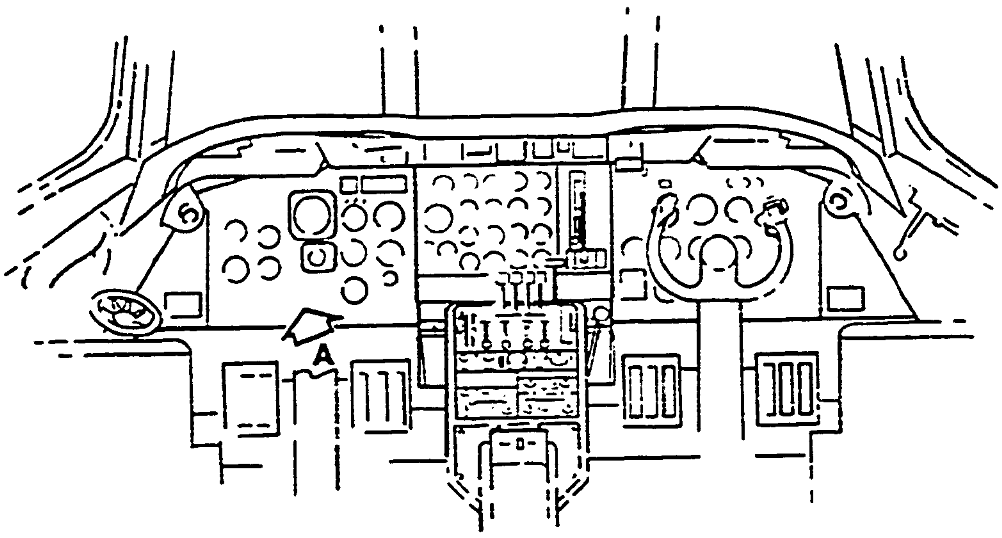
NOTE: The lifting motion shifts the pivot and displaces the bar assembly from the frame.

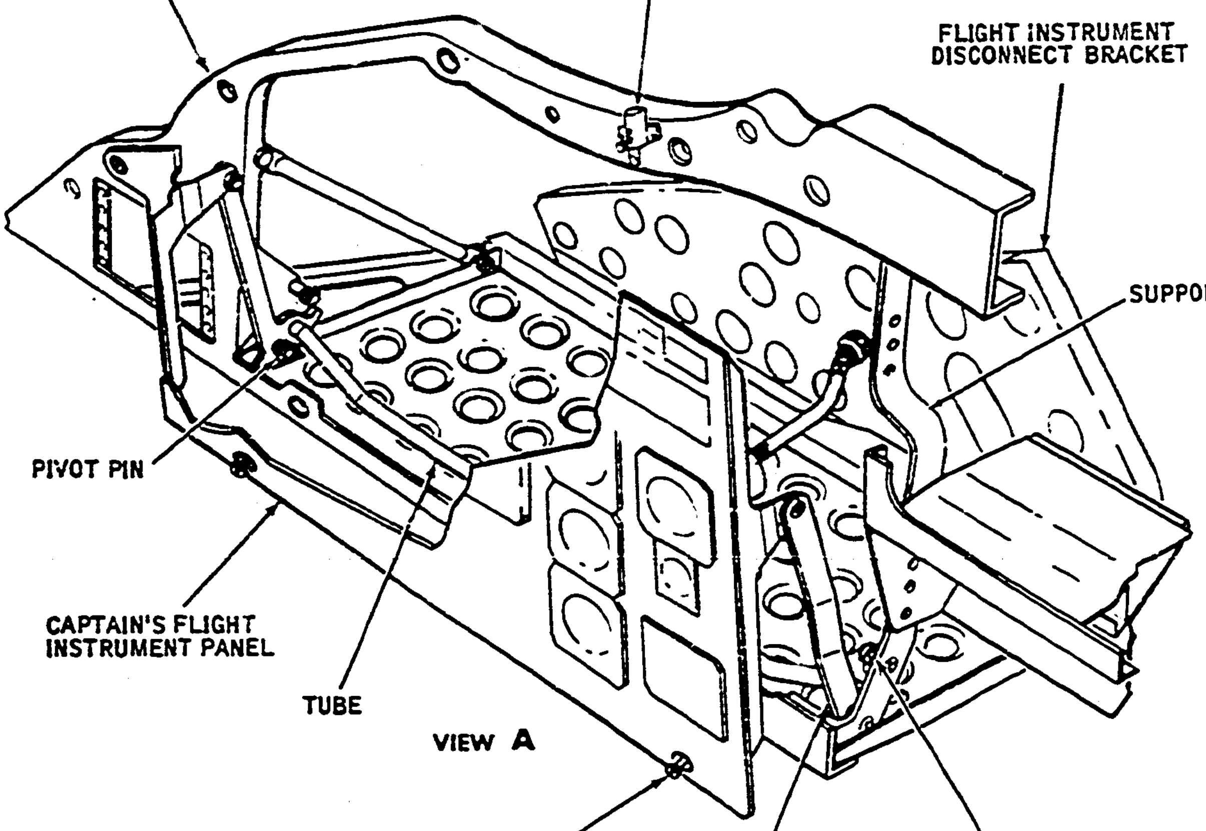
(10) Carefully pull panel aft and remove from cavity.

B. Install Panel

(1) Verify power is removed from airplane.

(2) Check that all indicators are securely clamped in panel.





Captain's Flight Instrument Panel Replacement
Figure 201

(3) Carefully place panel in cavity, tilted down; slide panel forward and guide bars into frame.

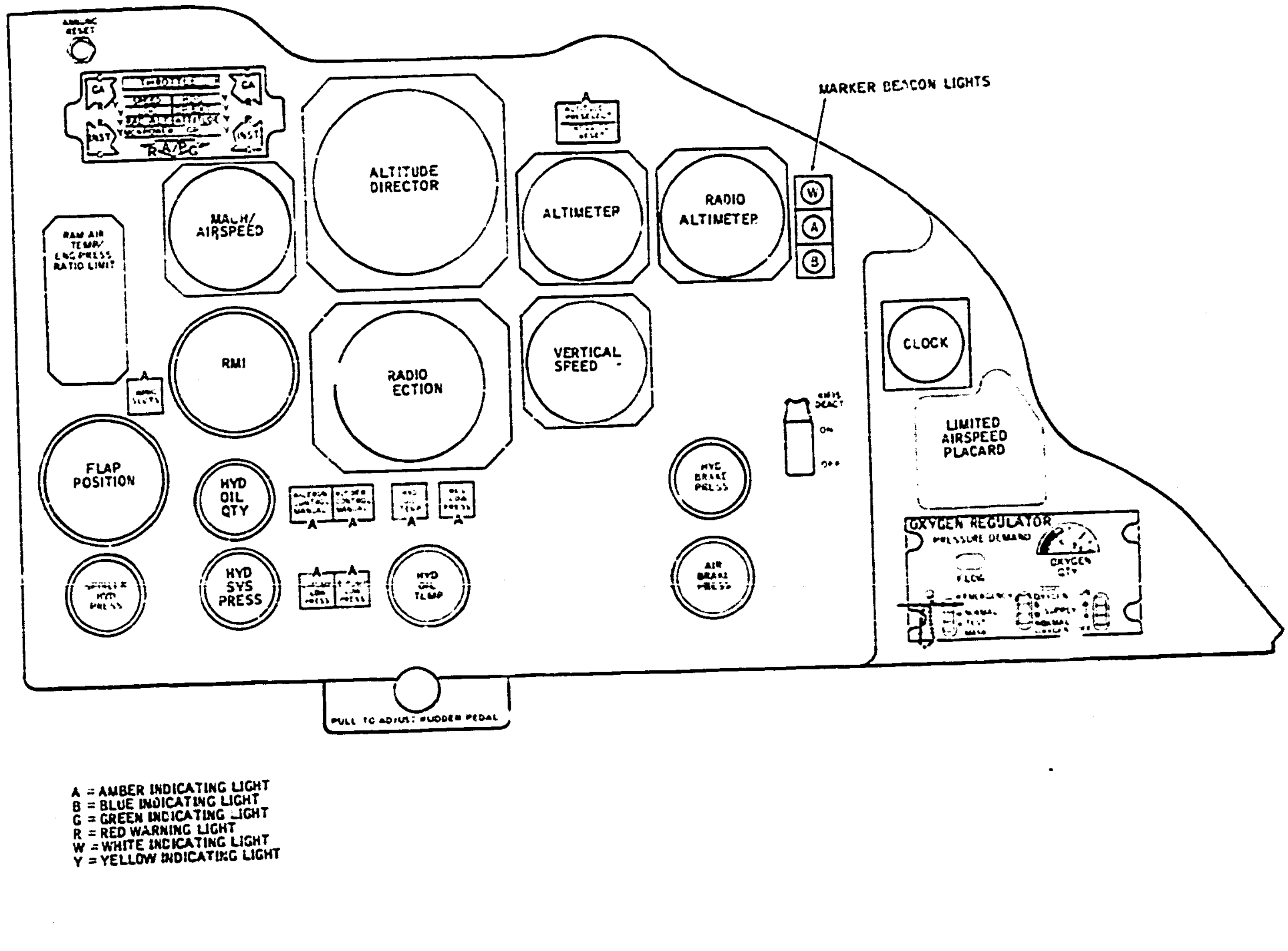
(4) Remove all caps and connect electrical and hose connections.

(5) Retract the spring-loaded safety latch and swing panel into position.

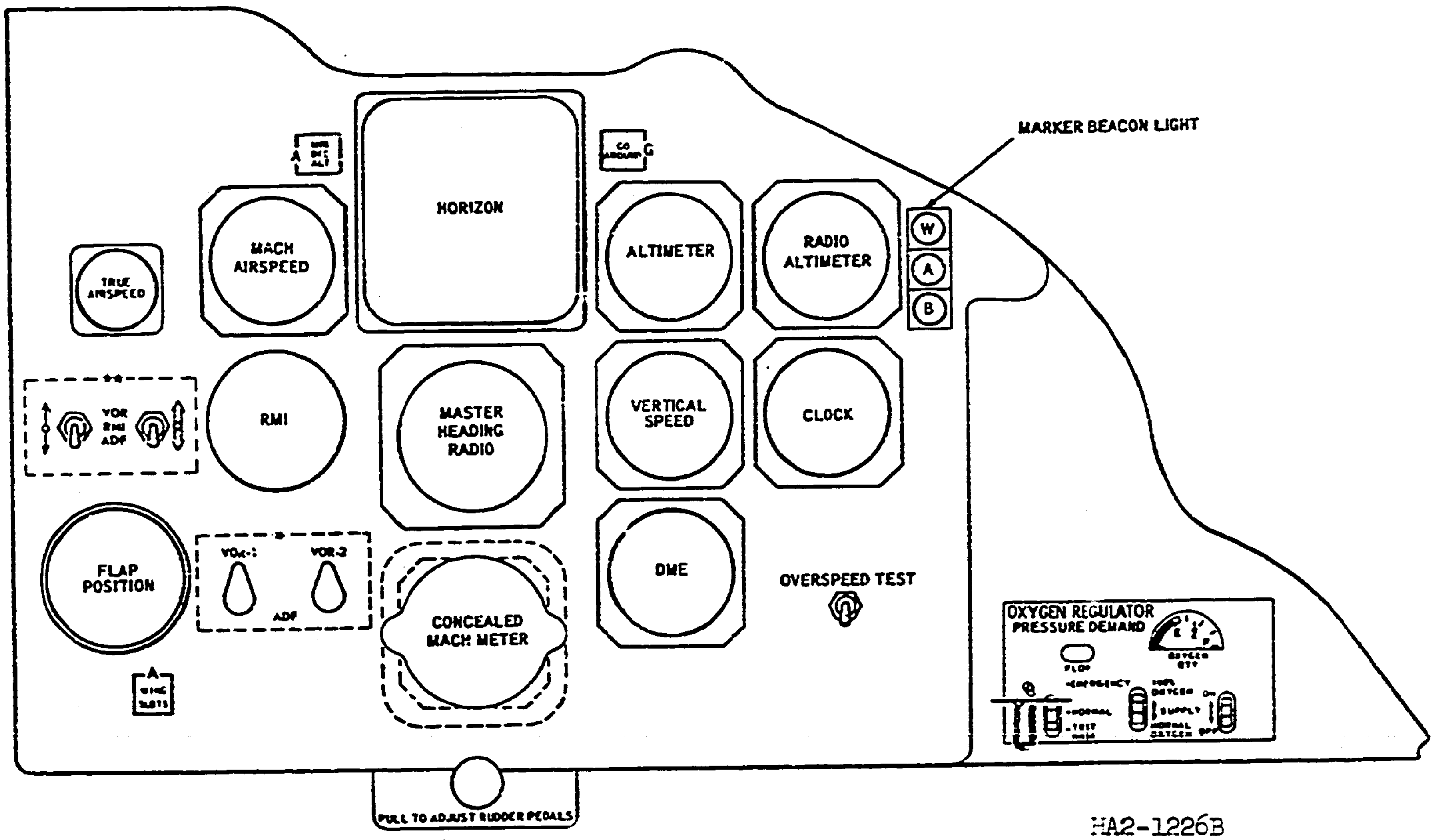
(6) Secure the five quick-release fasteners.

(7) Perform operational test of all systems involved to determine integrity of new installation.

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First Officer's Instrument Panel
Figure 1

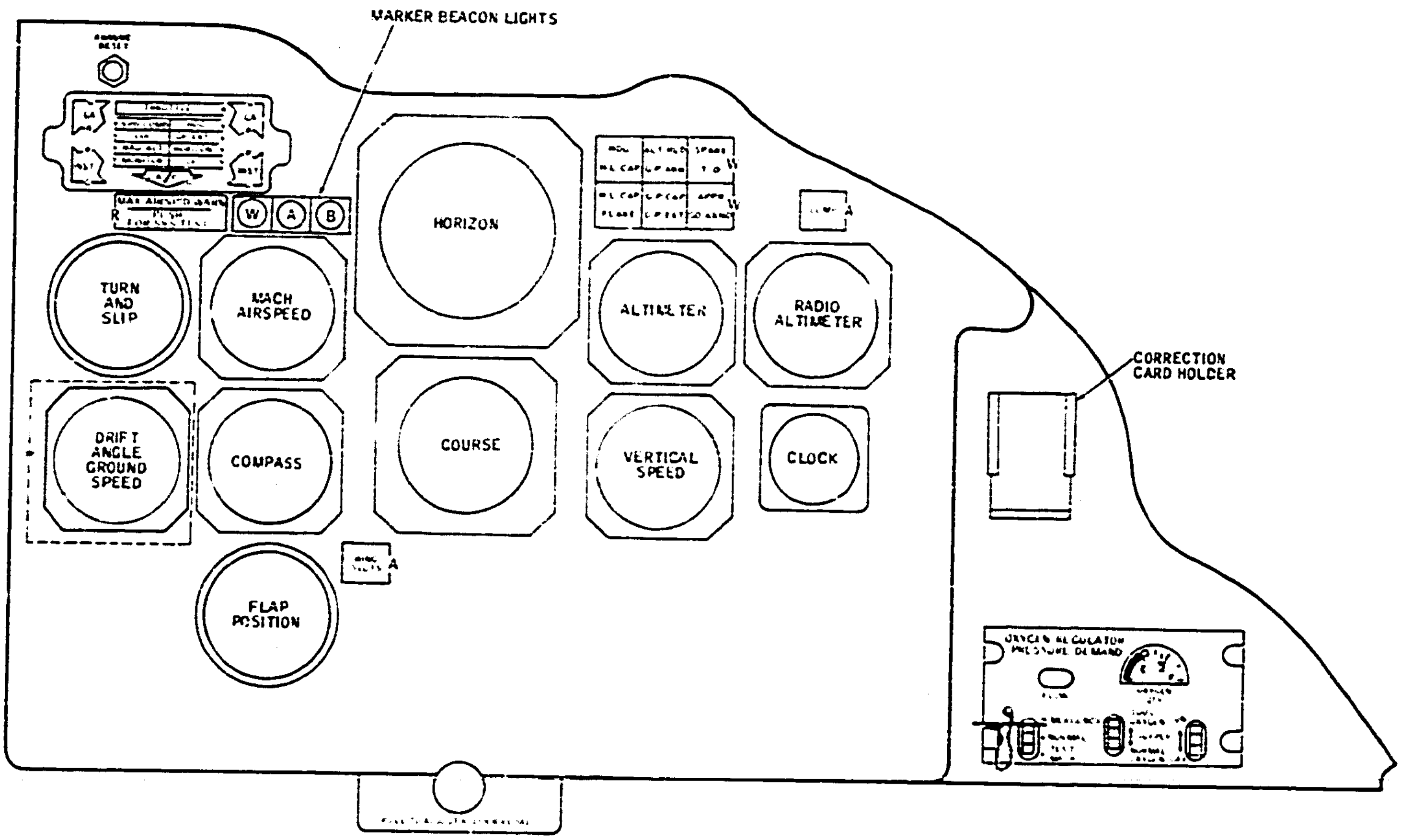


A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT
W = WHITE INDICATING LIGHT

* NOT INSTALLED ON N8070U, N8071U, N8072U, N8073U, N8074U, N8075U, N8076U

** INSTALLED ON N8070U, N8071U, N8072U, N8073U, N8074U, N8075U, N8076U

First Officer's Flight Instrument Panel
Figure 1

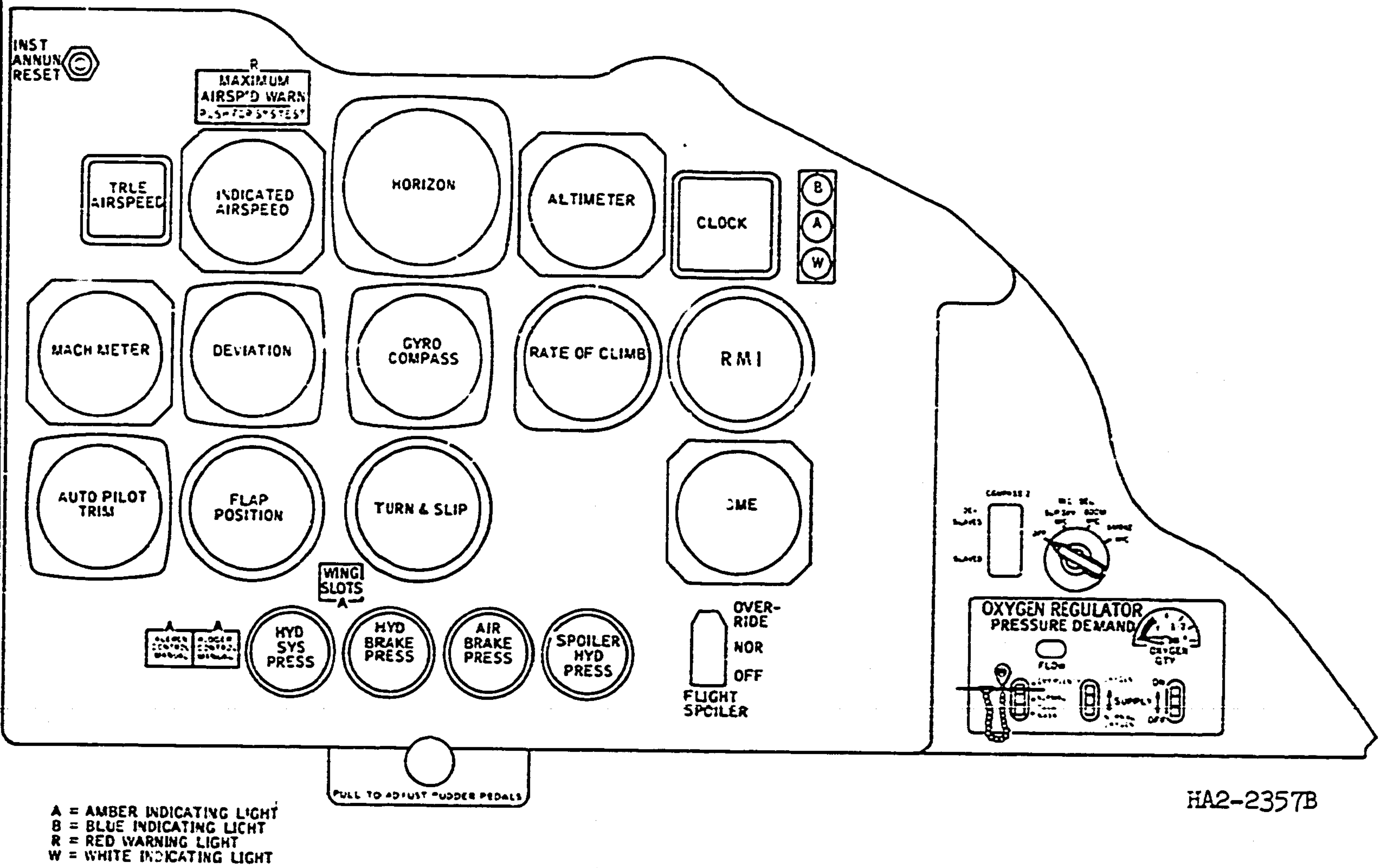


A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT
R = RED WARNING LIGHT
W = WHITE INDICATING LIGHT
Y = YELLOW INDICATING LIGHT

*INSTALLED ON N8776, N8777, N8778

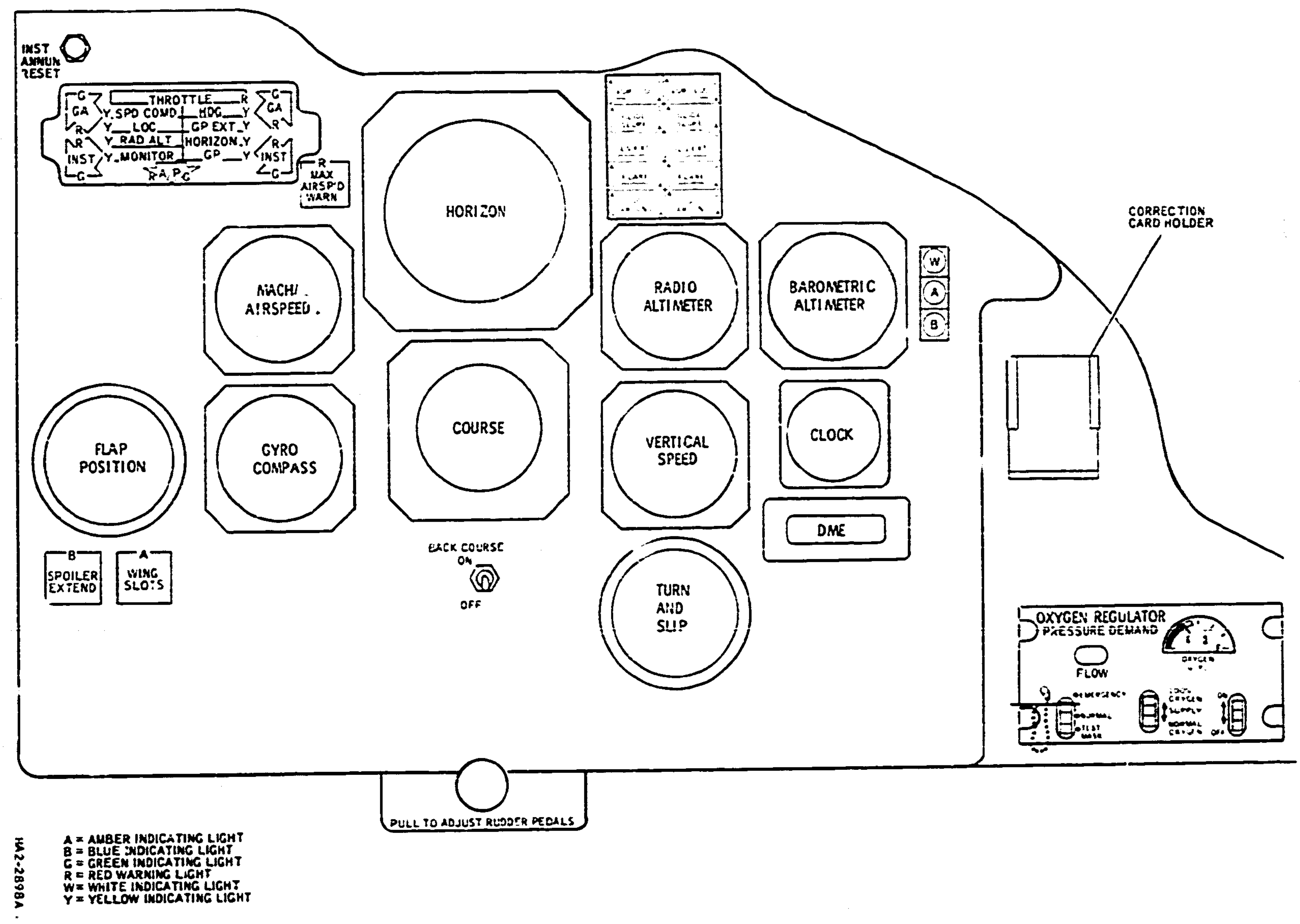
HA2-1325C

First Officer's Flight Instrument Panel
Figure 1

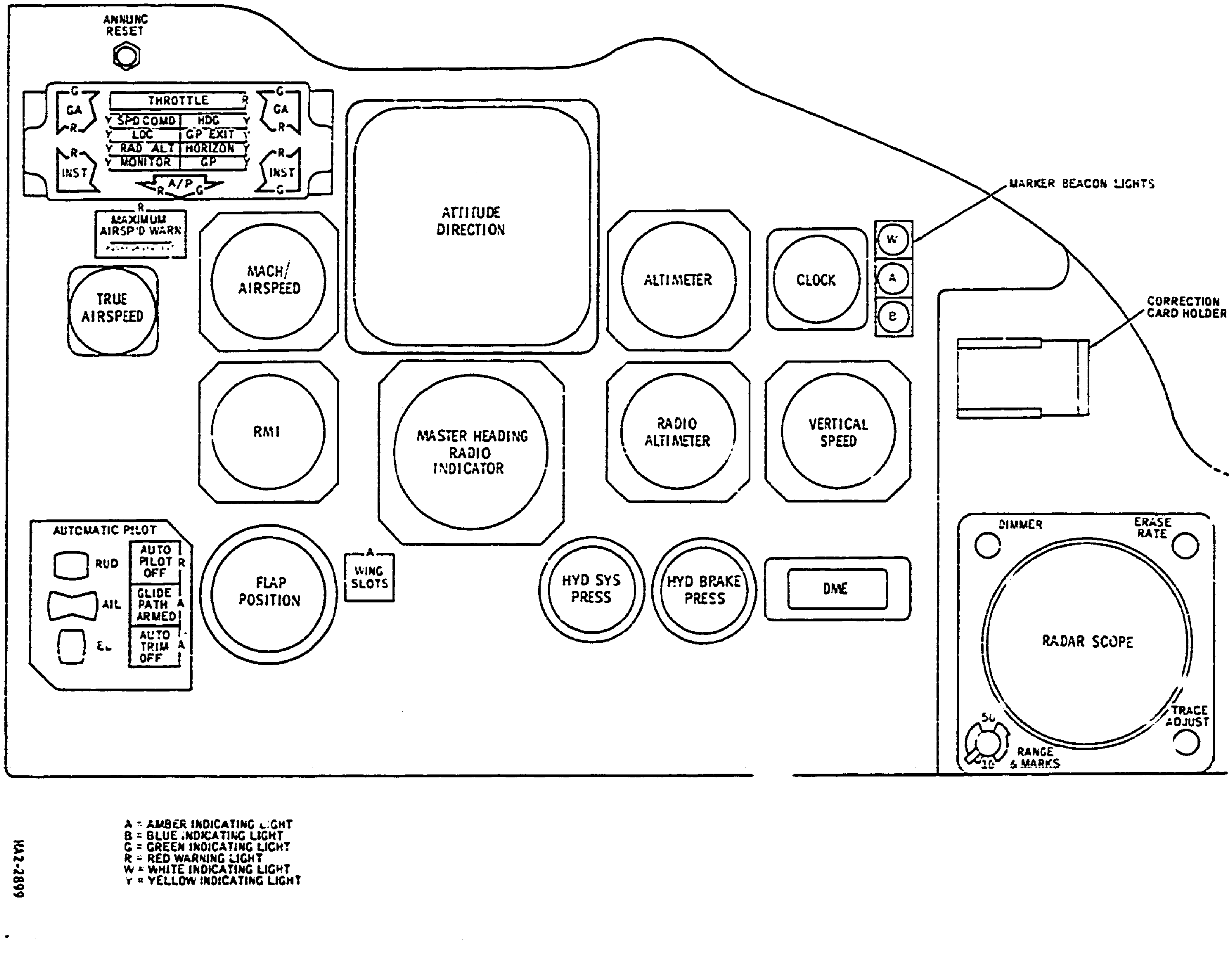


HA2-2357B

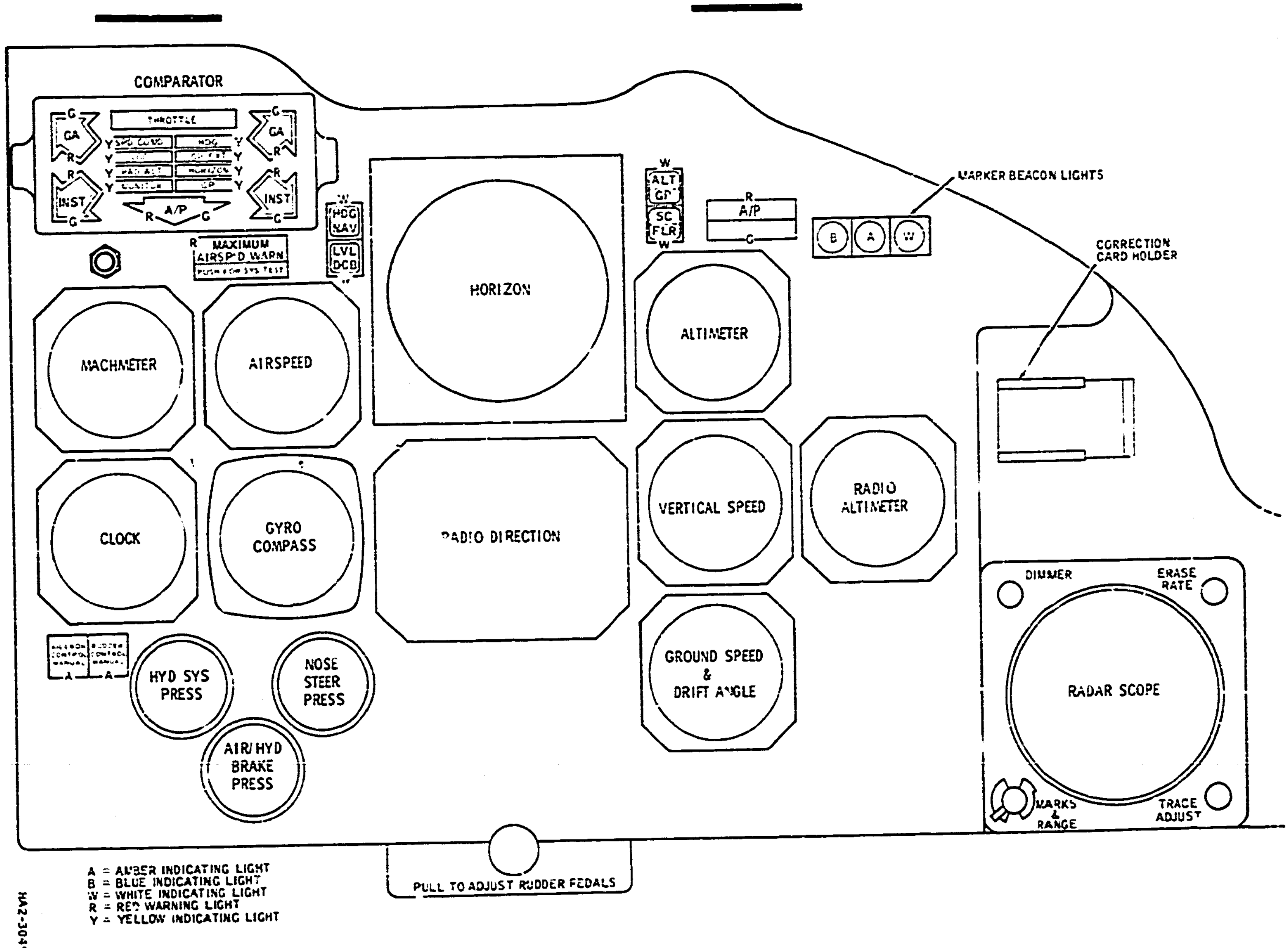
First Officer's Flight Instrument Panel
Figure 1



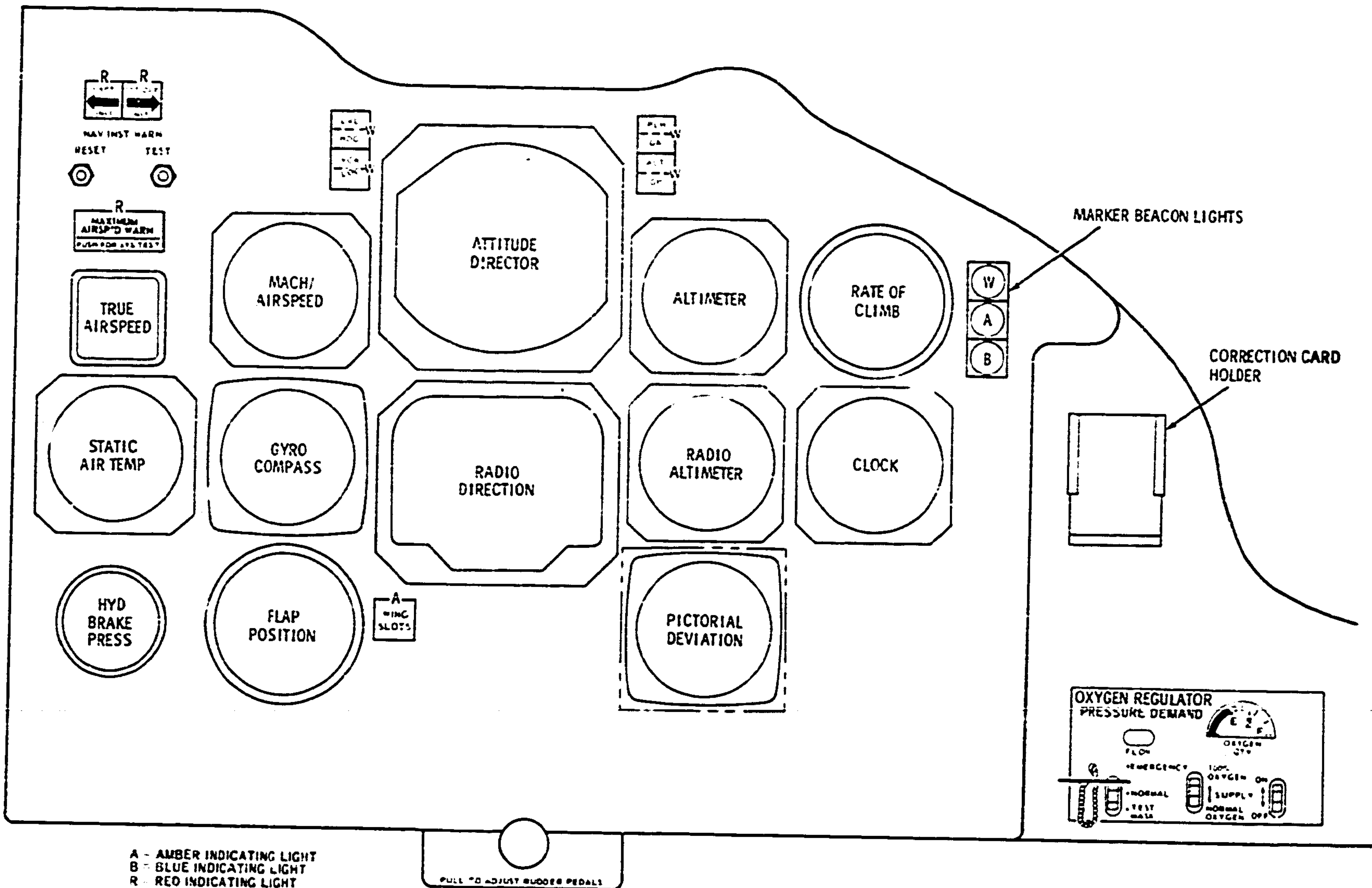
First Officer's Flight Instrument Panel
Figure 1



First Officer's Flight Instrument Panel
Figure 1



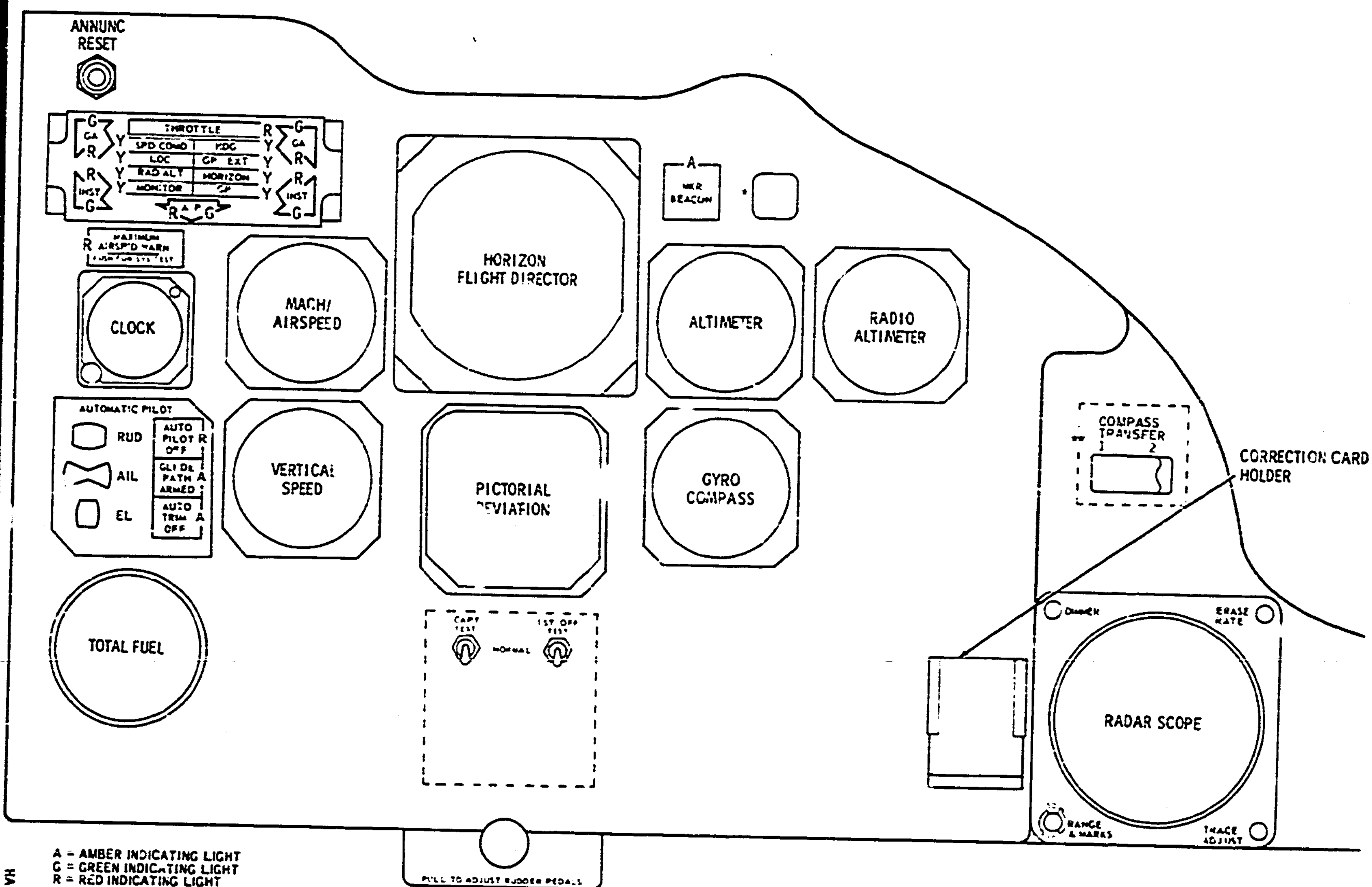
First Officer's Flight Instrument Panel
Figure 1



A - AMBER INDICATING LIGHT
B - BLUE INDICATING LIGHT
R - RED INDICATING LIGHT
W - WHITE INDICATING LIGHT
* INSTALLED ON I-DIWN, I-DIWV, I-DIWC, I-DIWO

HA2-35778

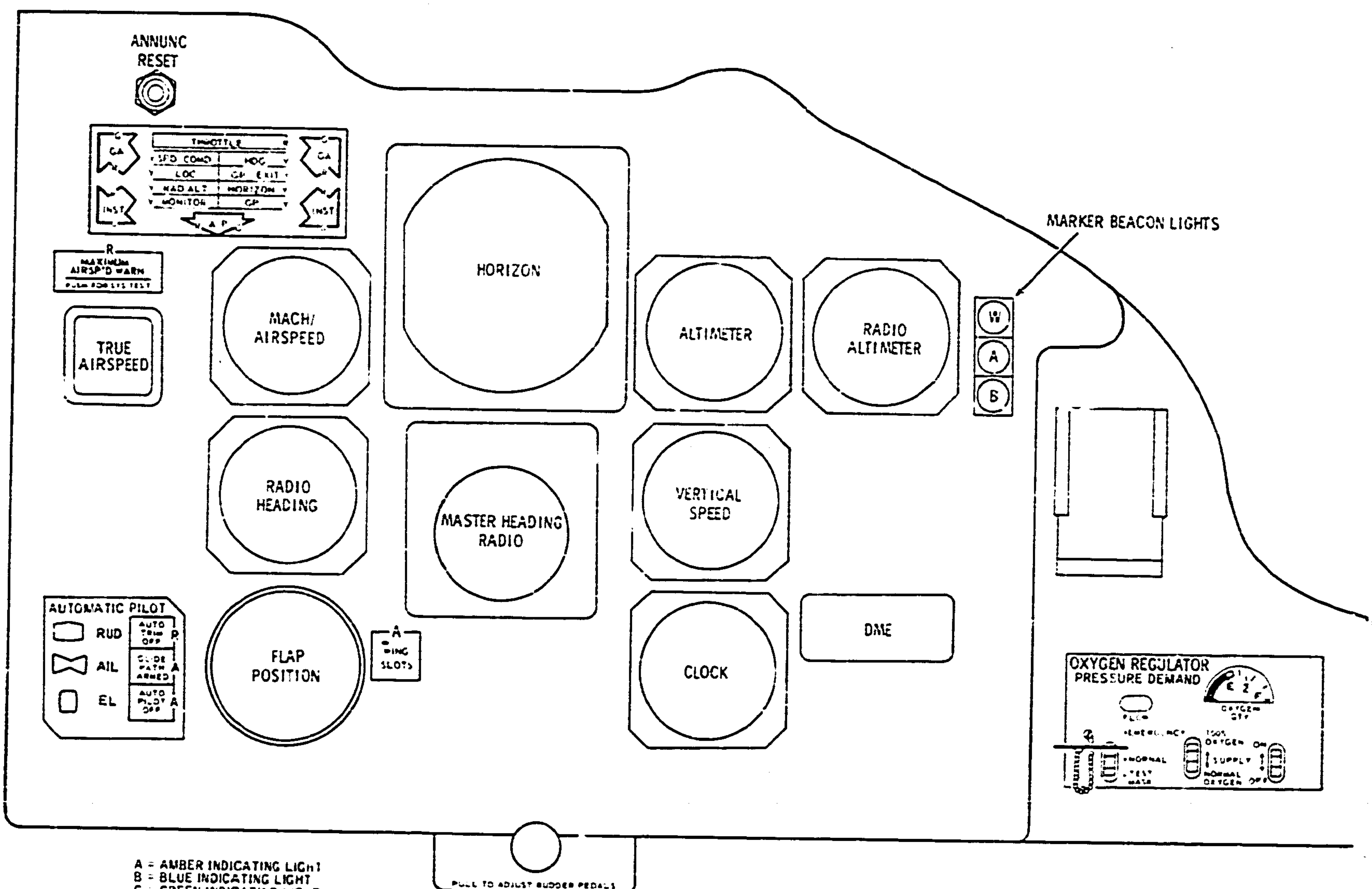
First Officer's Flight Instrument Panel
Figure 1



A = AMBER INDICATING LIGHT
G = GREEN INDICATING LIGHT
R = RED INDICATING LIGHT
Y = YELLOW INDICATING LIGHT
* = AUTOMATIC PILOT ANNUNCIATOR
** = NOT INSTALLED ON 867 AND SUBSEQUENT
*** = INSTALLED ON 860-863

HA2-3597C

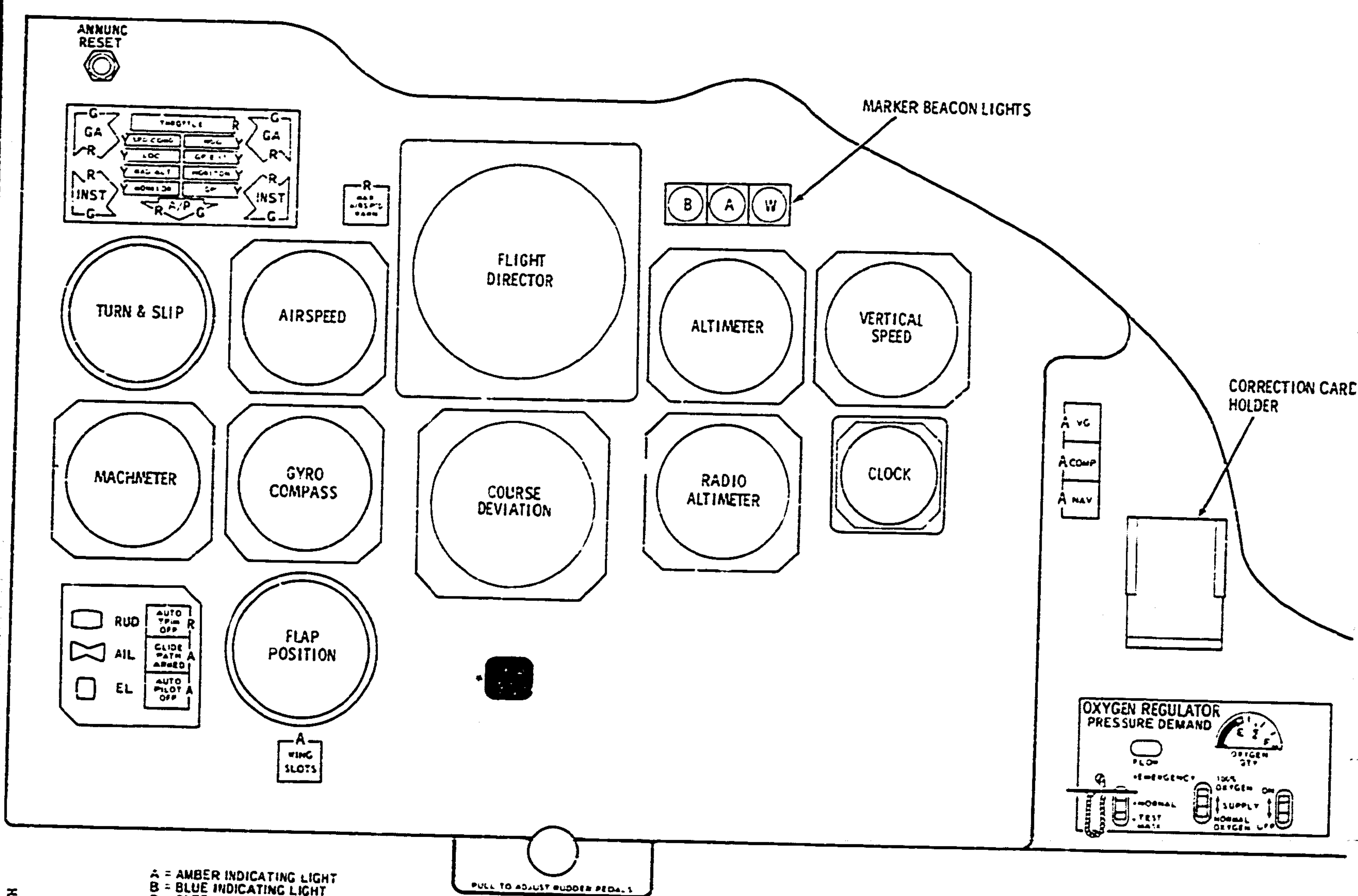
First Officer's Flight Instrument Panel
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
G - GREEN INDICATING LIGHT
R - RED WARNING LIGHT
W - WHITE INDICATING LIGHT
Y - YELLOW INDICATING LIGHT

HA2-3614A

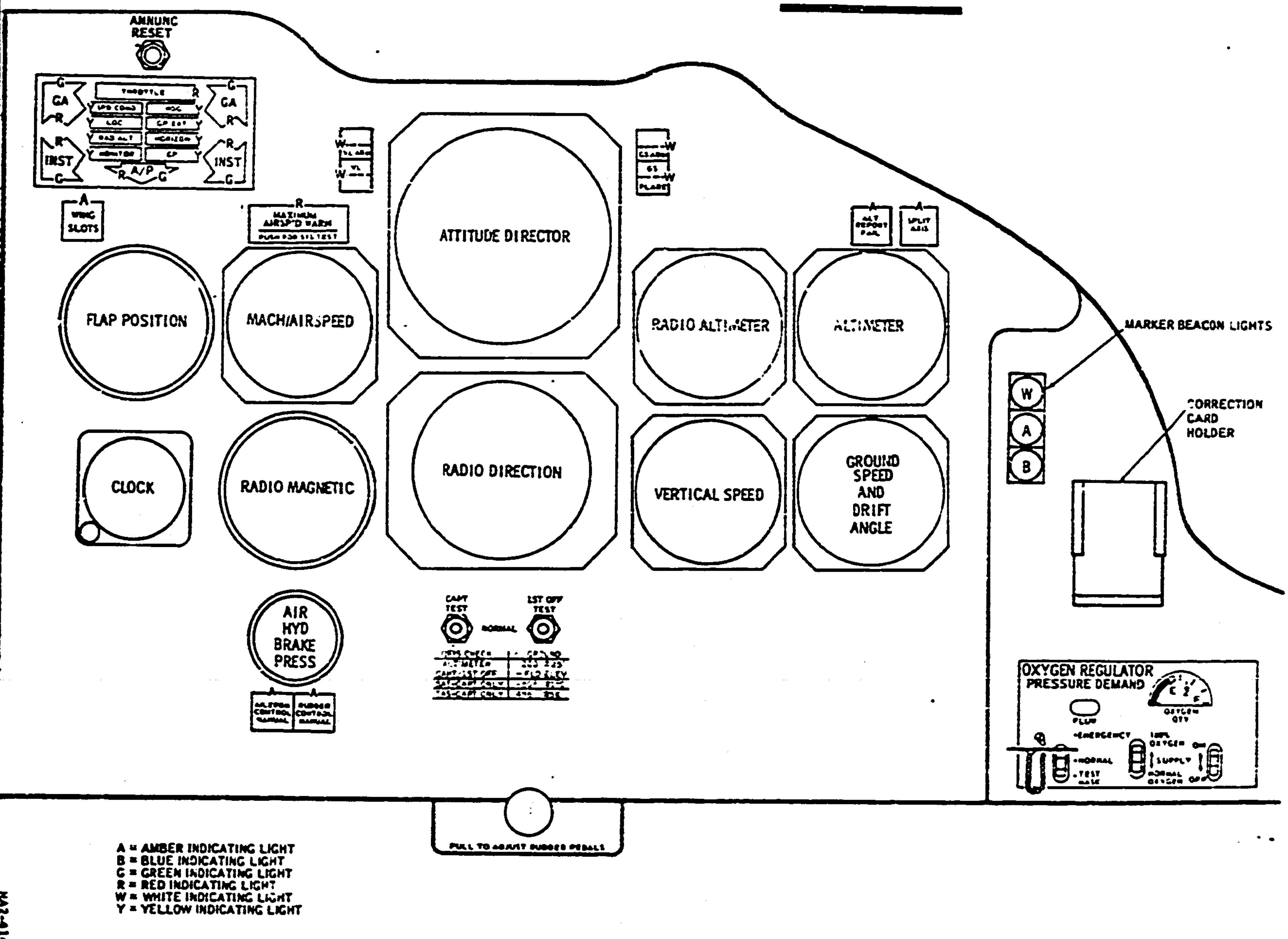
First Officer's Flight Instrument Panel
Figure 1



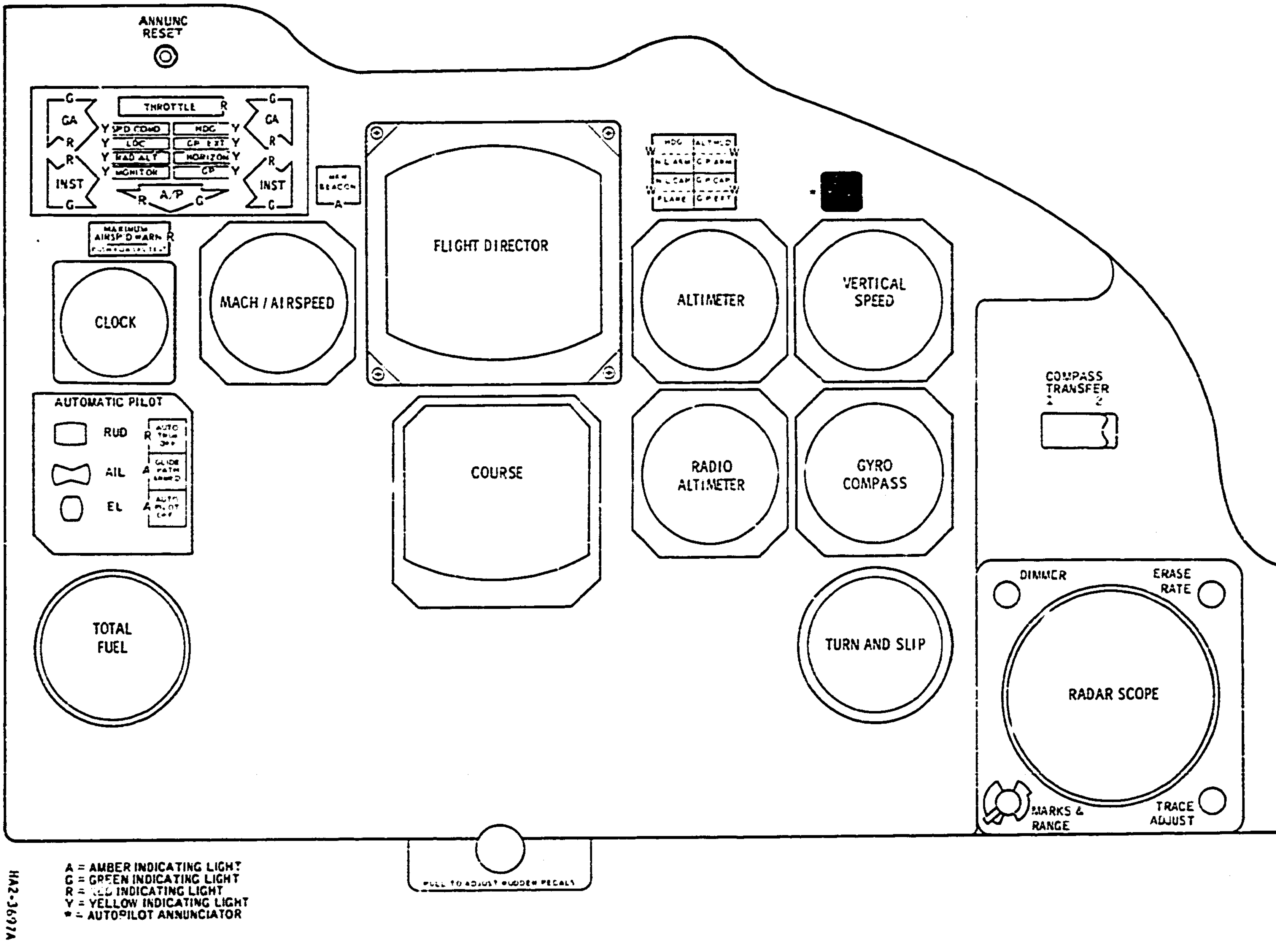
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT
R = RED INDICATING LIGHT
W = WHITE INDICATING LIGHT
Y = YELLOW INDICATING LIGHT
* = AUTO PILOT ANNUNCIATOR

HA2-3648

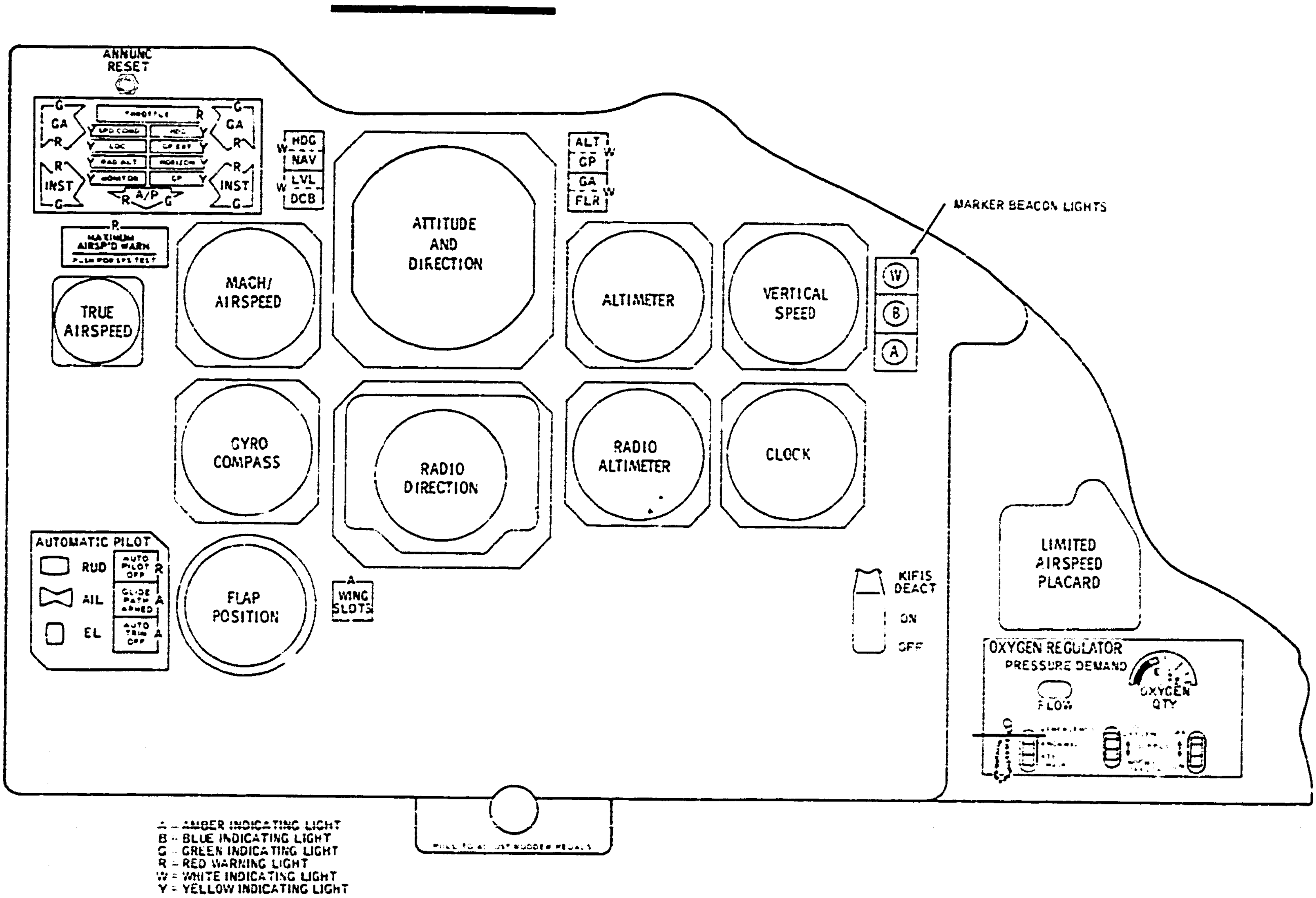
First Officer's Flight Instrument Panel
Figure 1



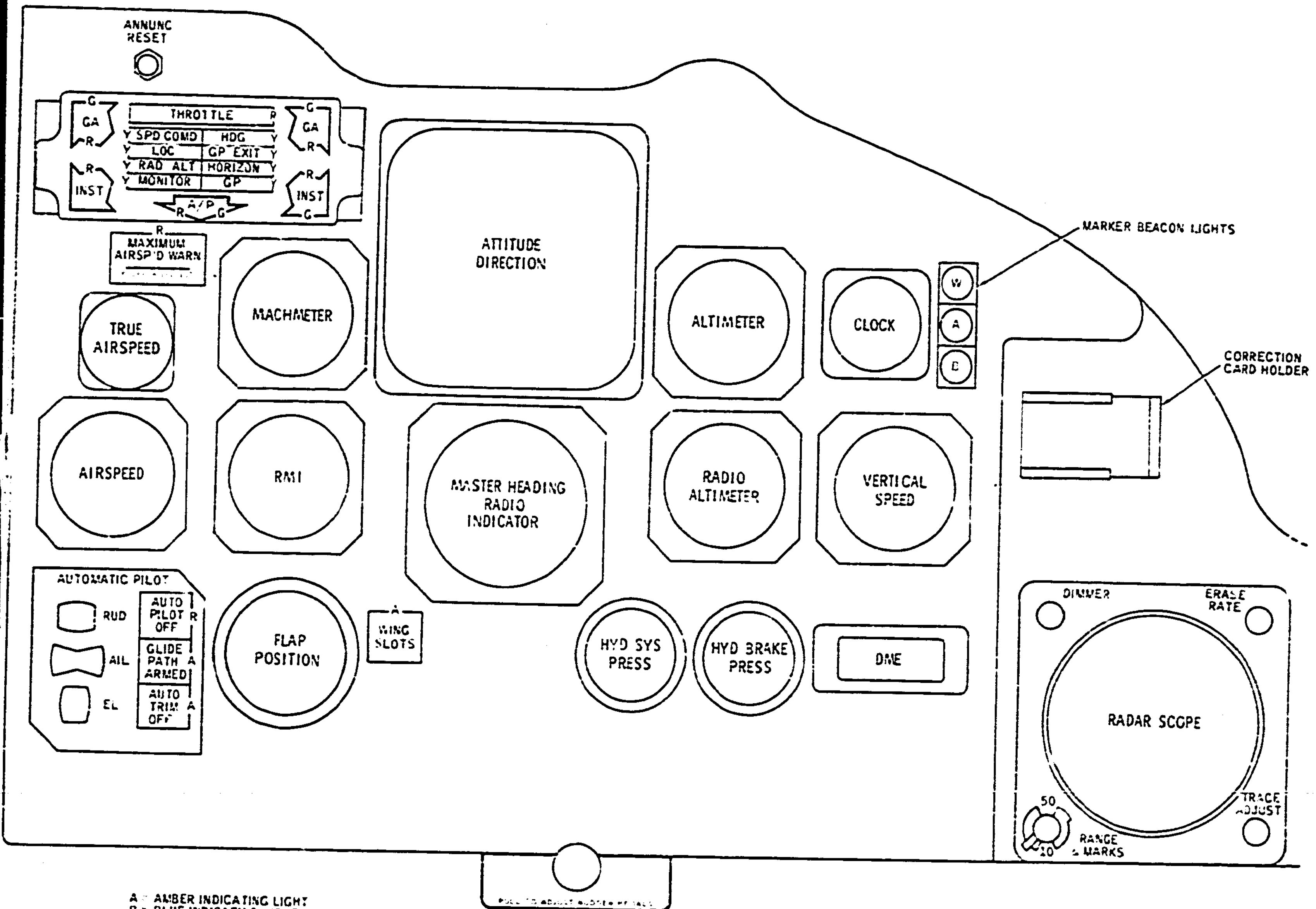
First Officer's Flight Instrument Panel
Figure 1



First Officer's Flight Instrument Panel
Figure 1



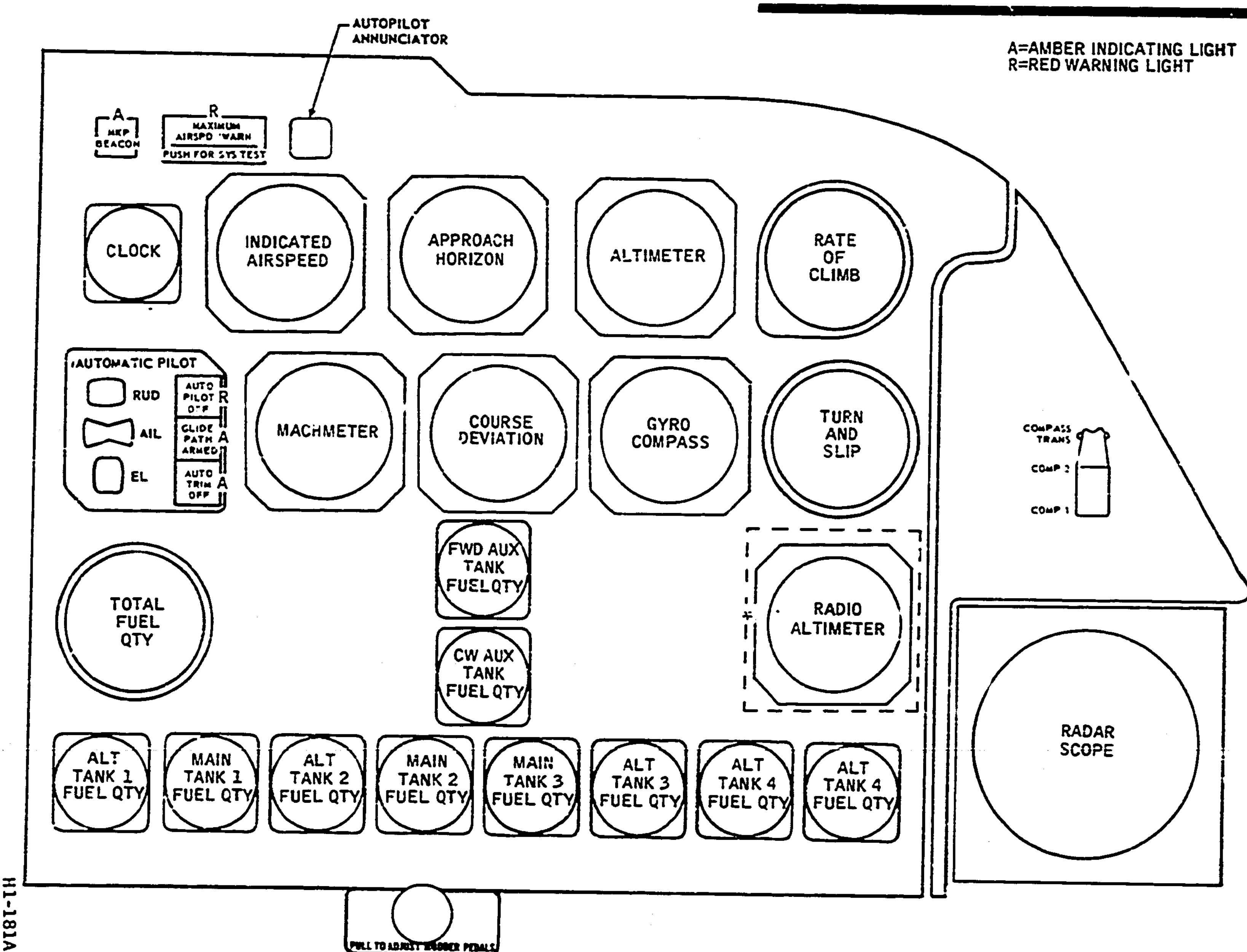
First Officer's Flight Instrument Panel
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT
R = RED WARNING LIGHT
W = WHITE INDICATING LIGHT
Y = YELLOW INDICATING LIGHT

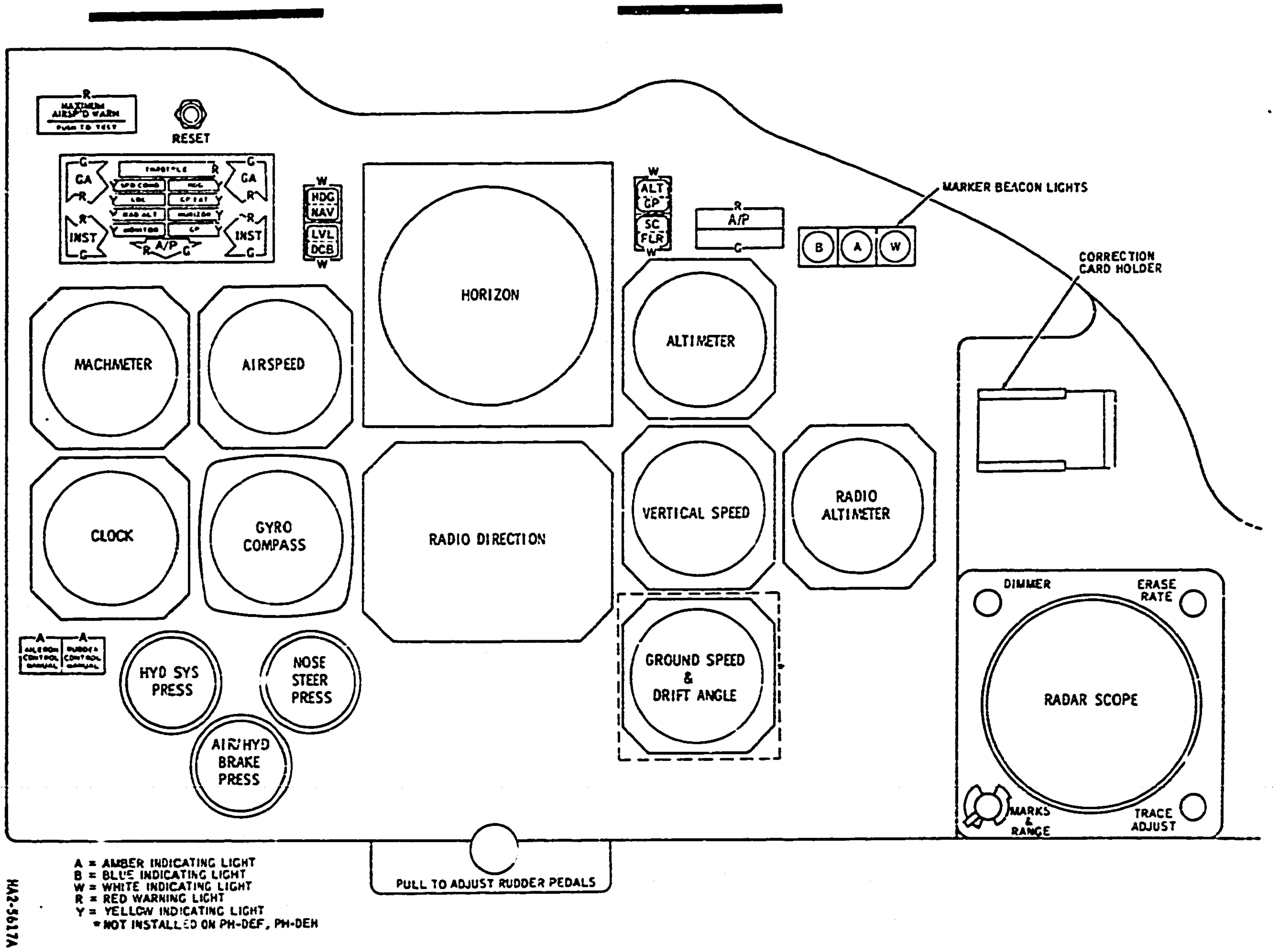
HA2-4223

First Officer's Flight Instrument Panel
Figure 1

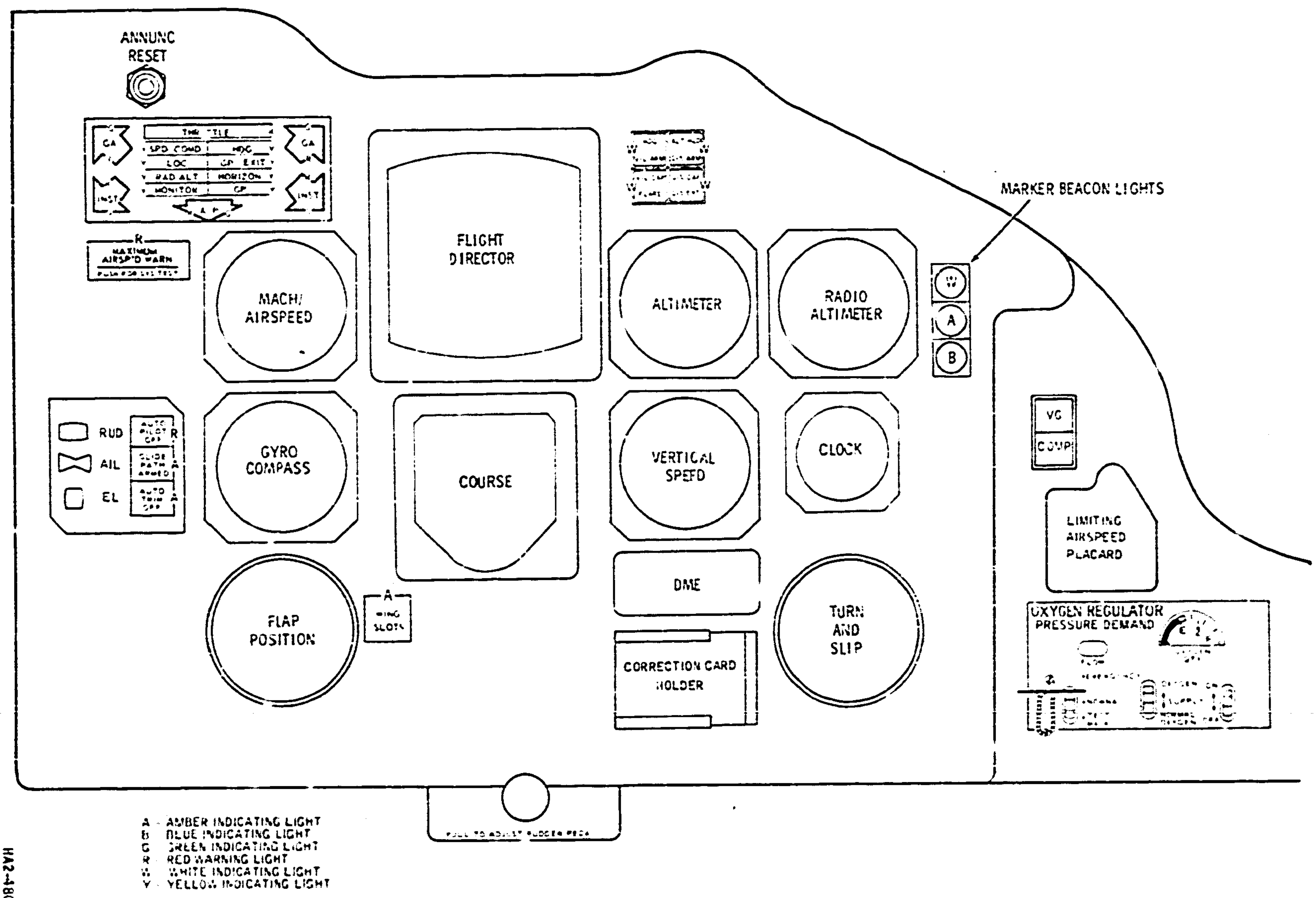


*INSTALLED ON 820-822 ONLY

First Officer's Flight Instrument Panel
Figure 1

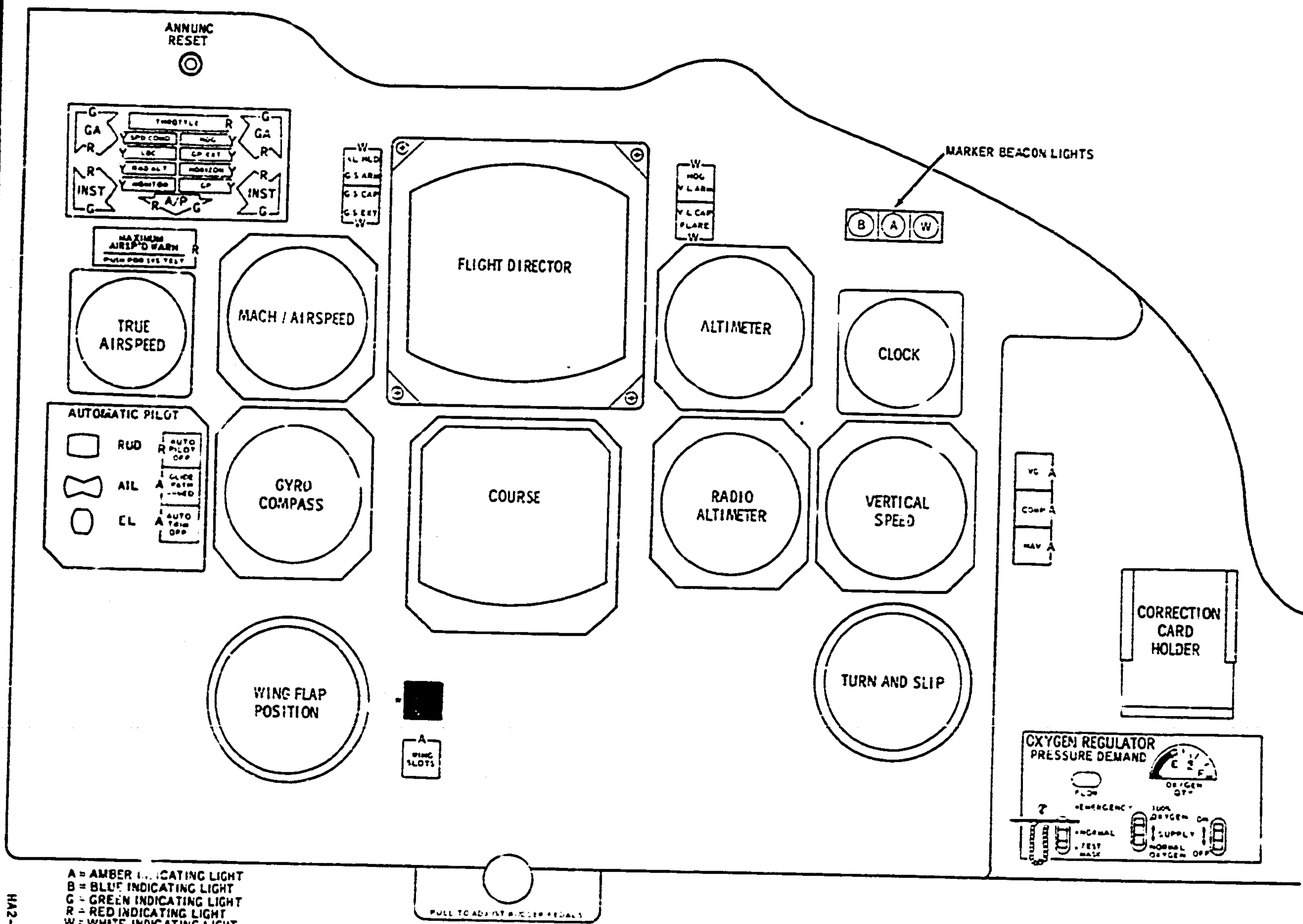


First Officer's Flight Instrument Panel
Figure 1



HA2-4805

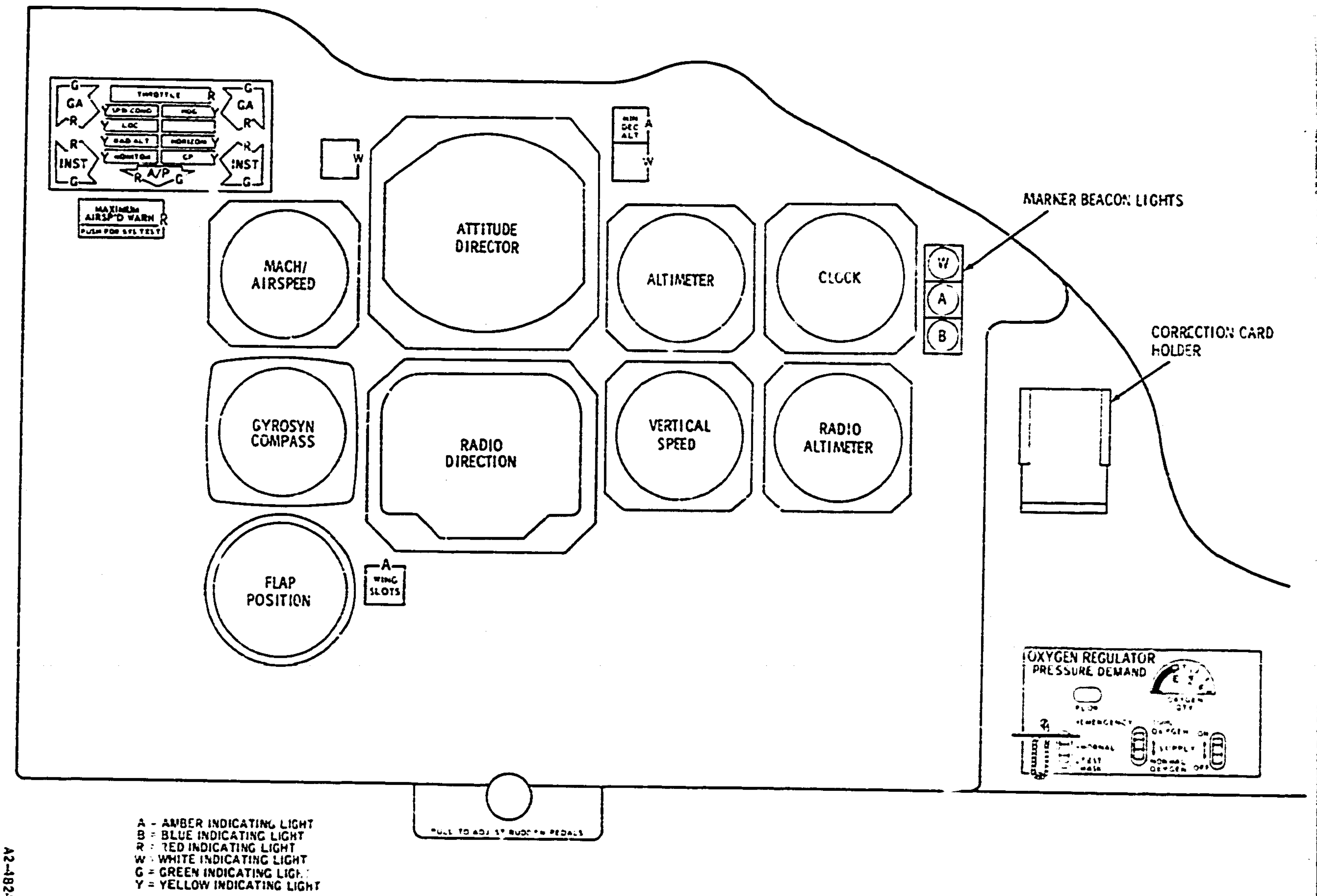
First Officer's Flight Instrument Panel
Figure 1



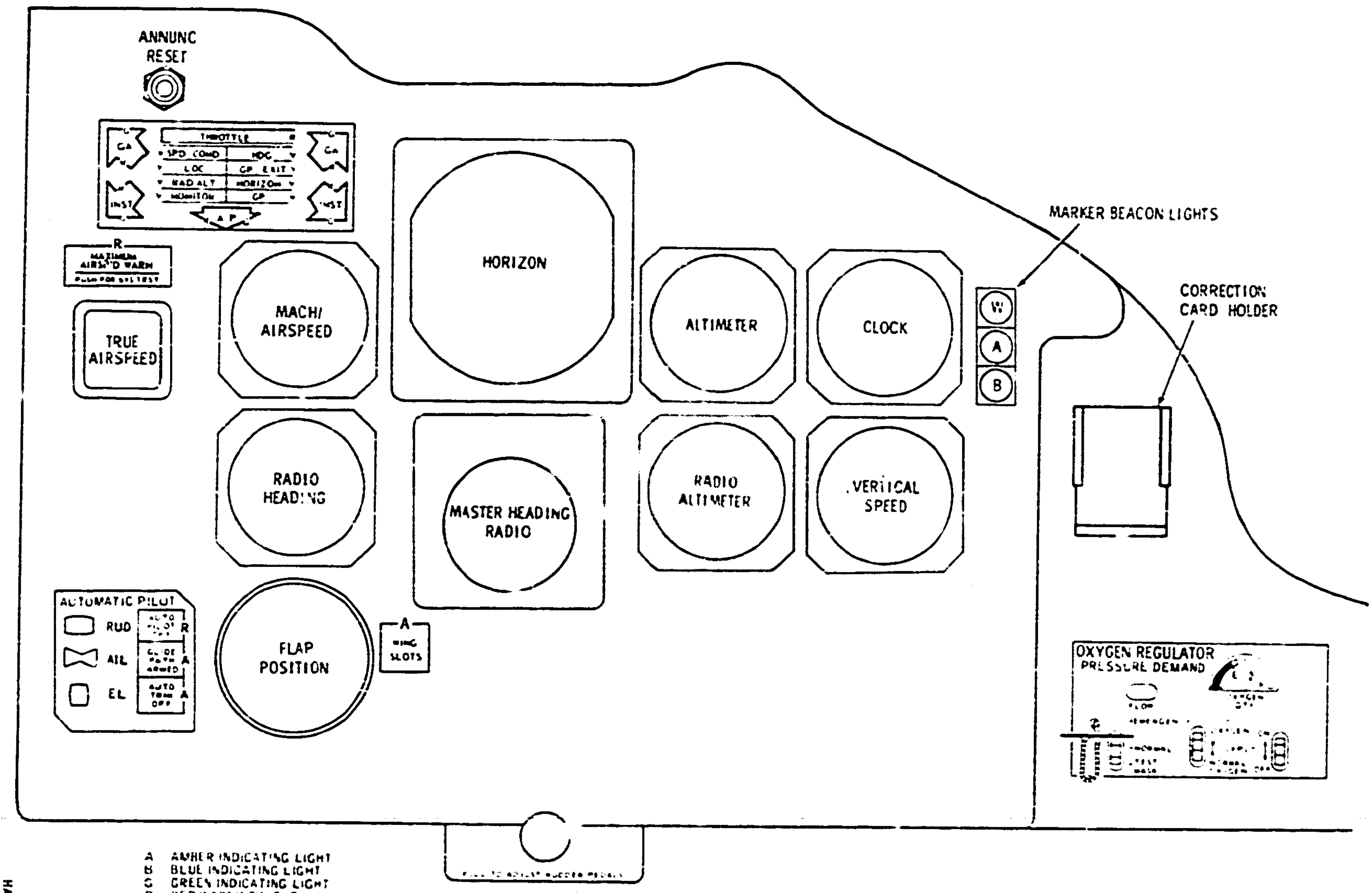
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT
R = RED INDICATING LIGHT
W = WHITE INDICATING LIGHT
Y = YELLOW INDICATING LIGHT
* AUTOPILOT ANNUNCIATOR

HA2-4022

First Officer's Flight Instrument Panel
Figure 1



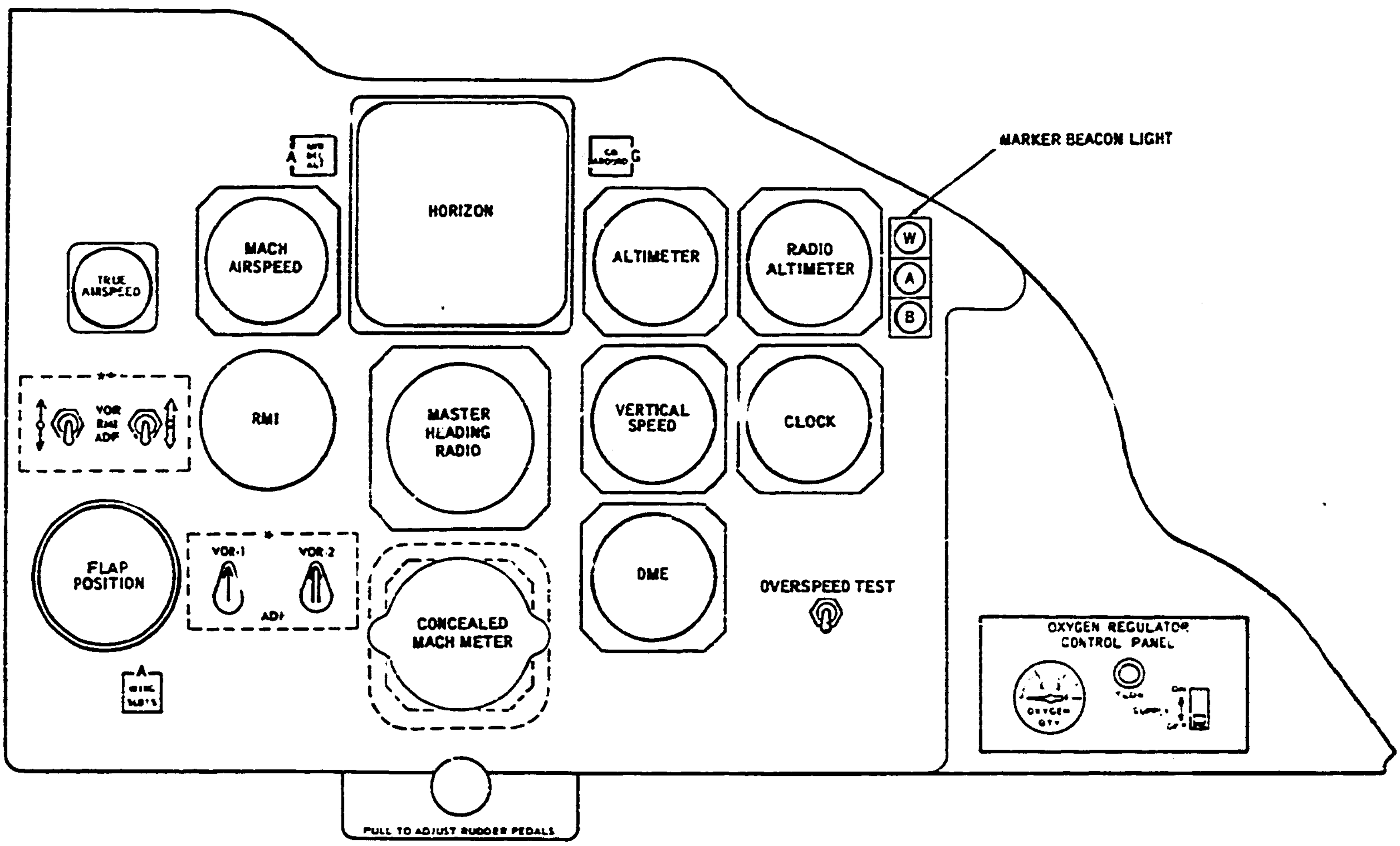
First Officer's Flight Instrument Panel
Figure 1



A AMBER INDICATING LIGHT
B BLUE INDICATING LIGHT
G GREEN INDICATING LIGHT
R RED WARNING LIGHT
W WHITE INDICATING LIGHT
Y YELLOW INDICATING LIGHT

HA2-4811

First Officer's Flight Instrument Panel
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
C = GREEN INDICATING LIGHT
W = WHITE INDICATING LIGHT

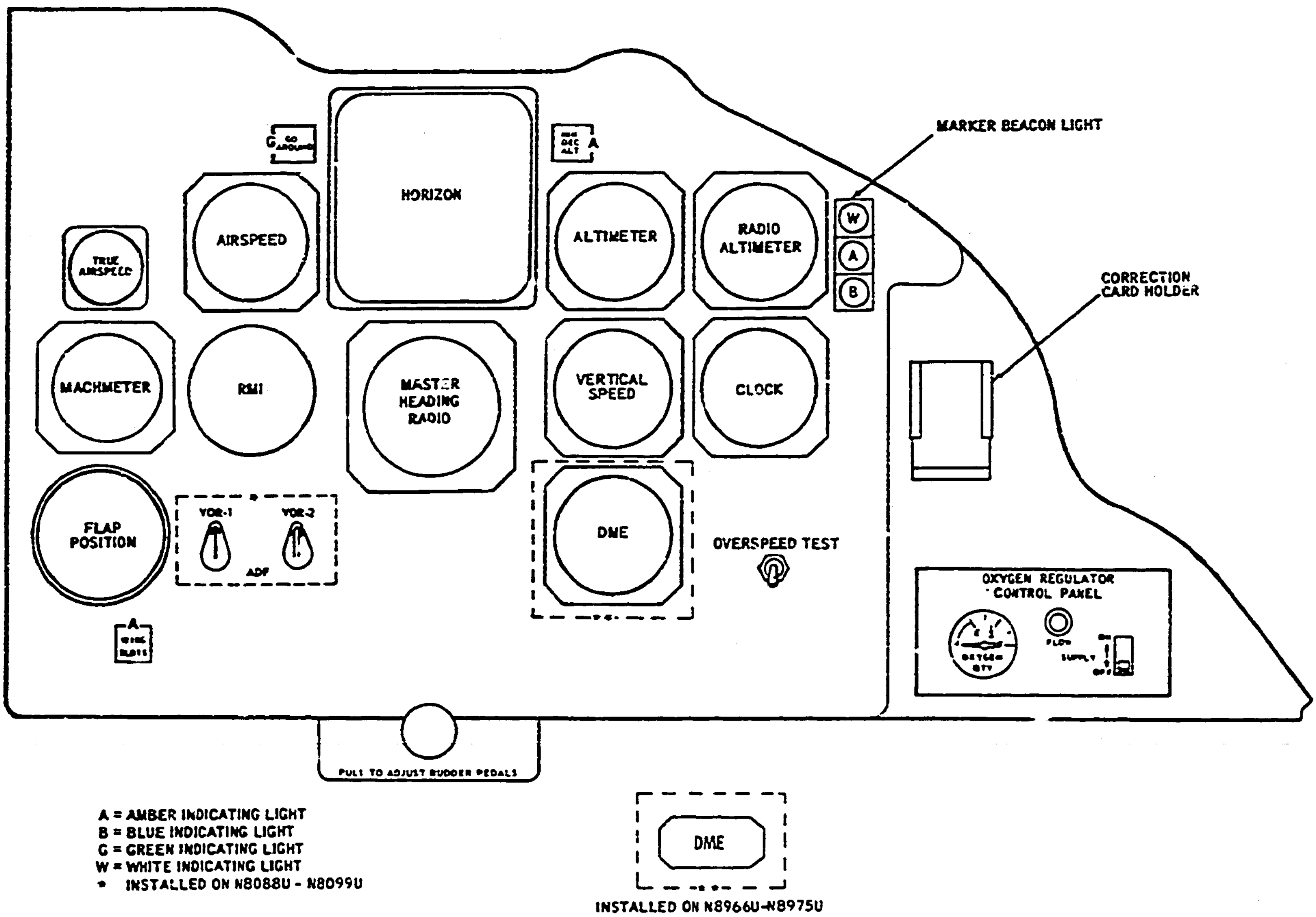
* NOT INSTALLED ON N8070U, N8071U, N8072U, N8073U, N8074U, N80 U, N8076U

** INSTALLED ON N8070U, N8071U, N8072U, N8073U, N8074U, N8075U, N8076U

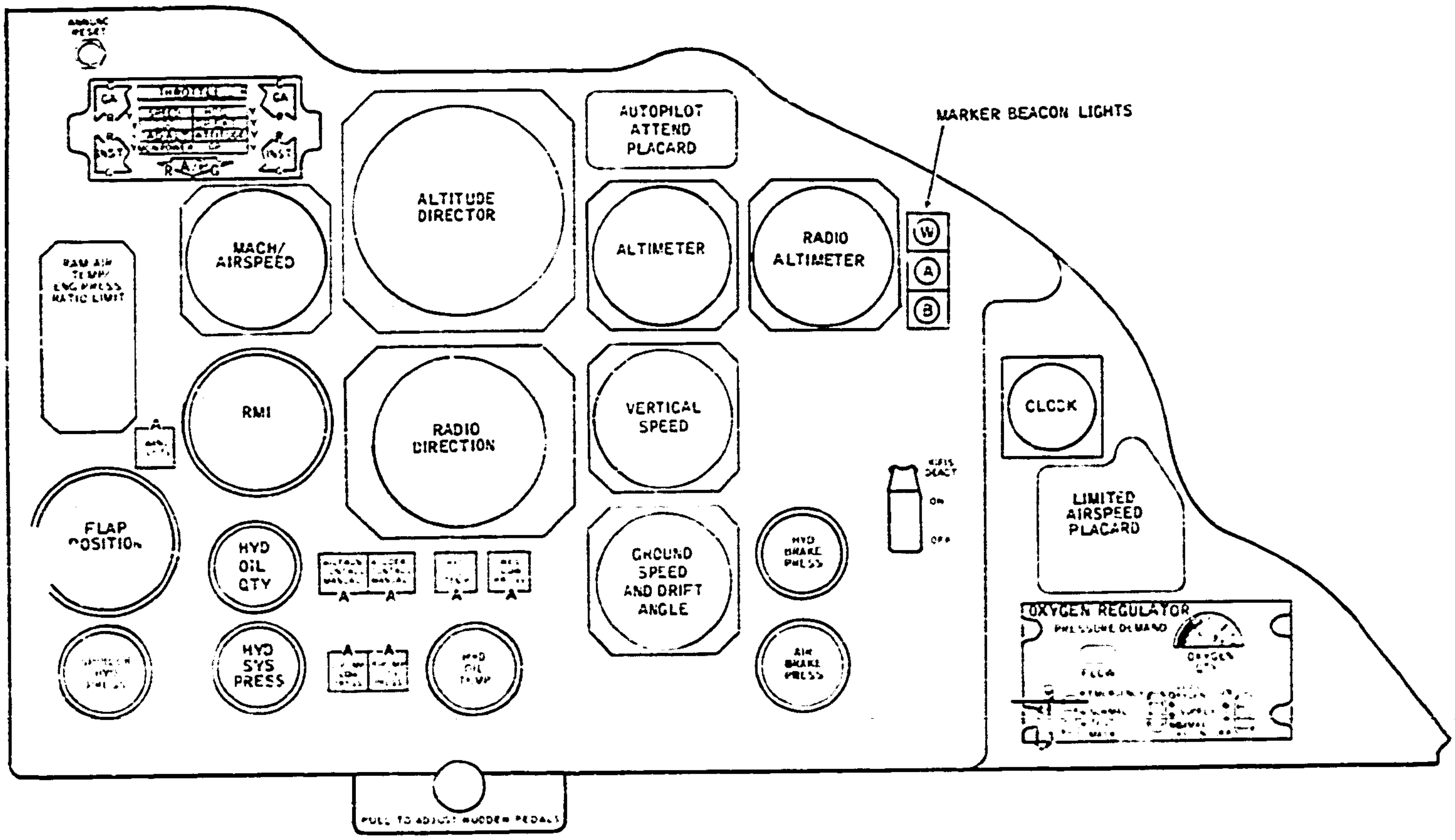
HA2-1857

First Officer's Flight Instrument Panel
Figure 1

Printed in U.S.A



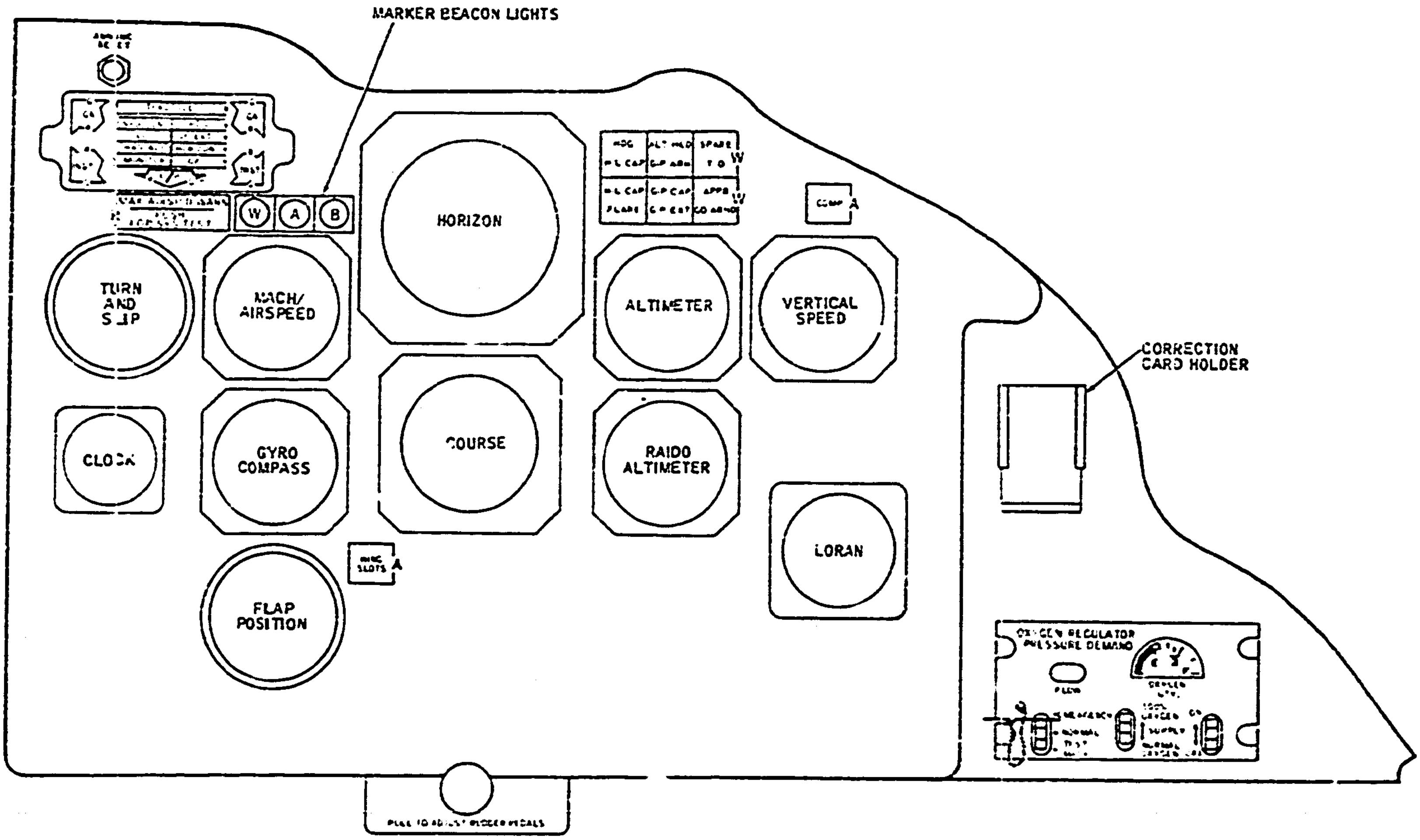
First Officer's Flight Instrument Panel
Figure 1



A - AMBER INDICATING LIGHT
B - BLUE INDICATING LIGHT
C - GREEN INDICATING LIGHT
R - RED WARNING LIGHT
W - WHITE INDICATING LIGHT
Y - YELLOW INDICATING LIGHT

1IA2-1450

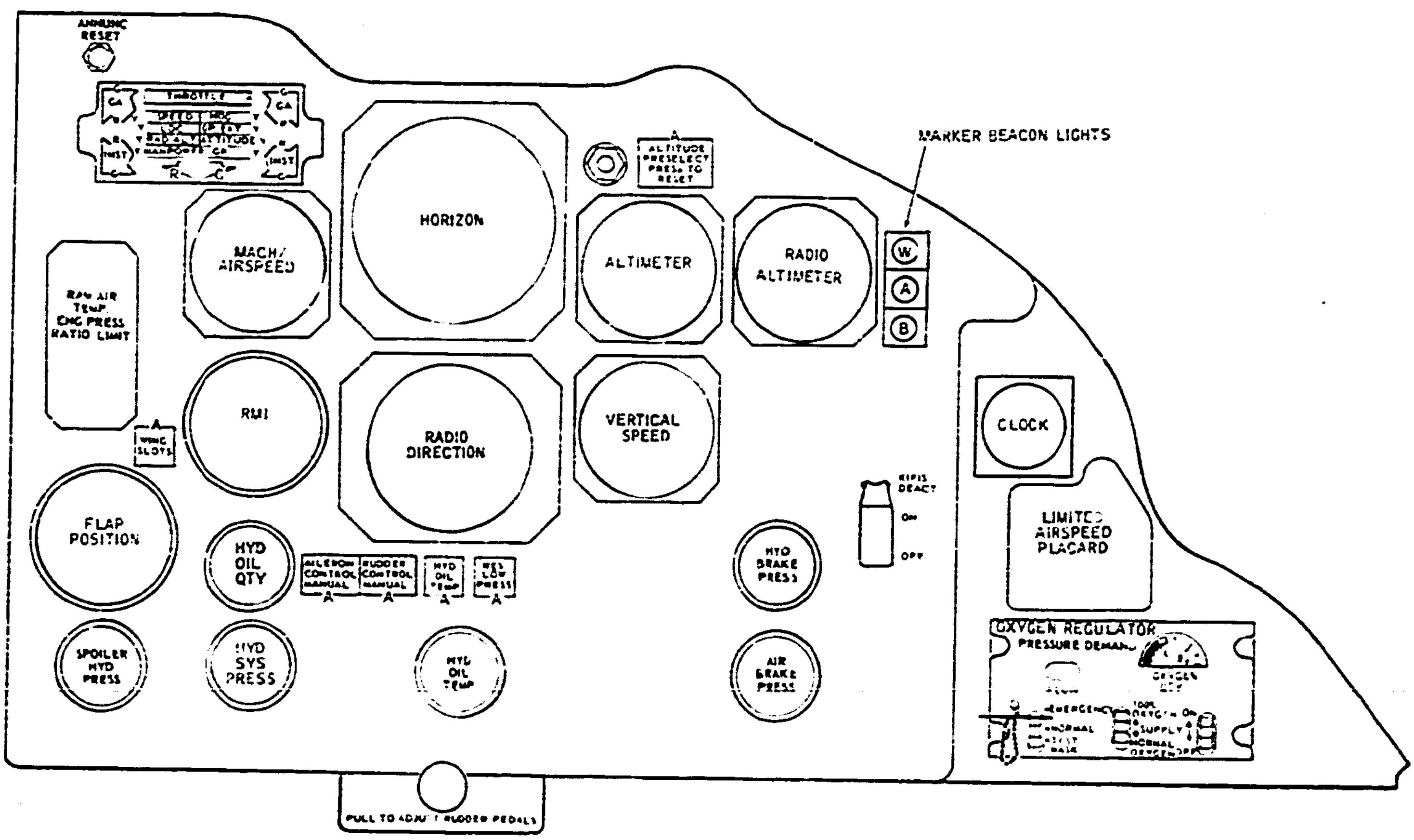
First Officer's Flight Instrument Panel
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT
R = RED WARNING LIGHT
W = WHITE INDICATING LIGHT
Y = YELLOW INDICATING LIGHT

HA2-5604

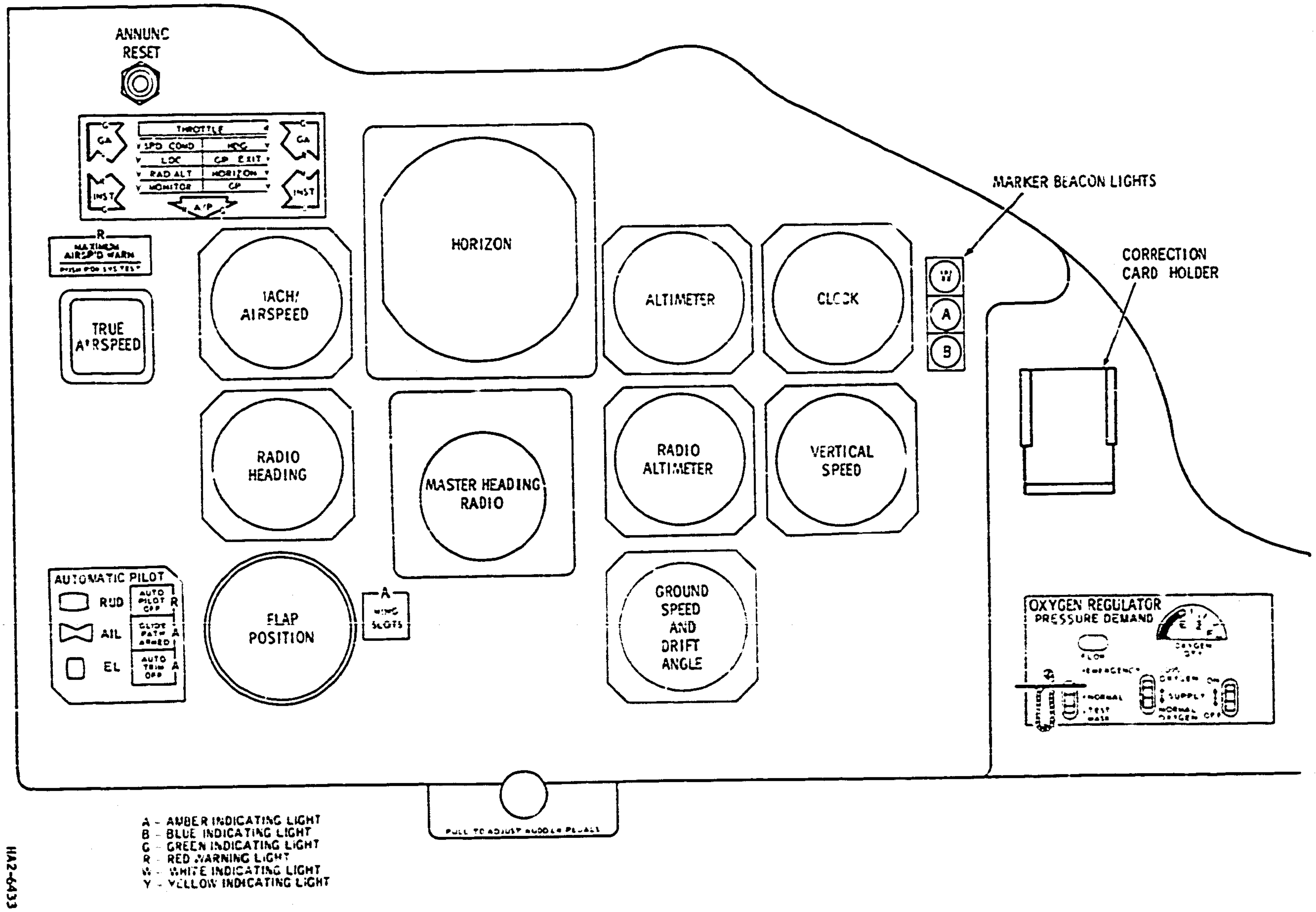
First Officer's Flight Instrument Panel
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT
R = RED WARNING LIGHT
W = WHITE INDICATING LIGHT
Y = YELLOW INDICATING LIGHT

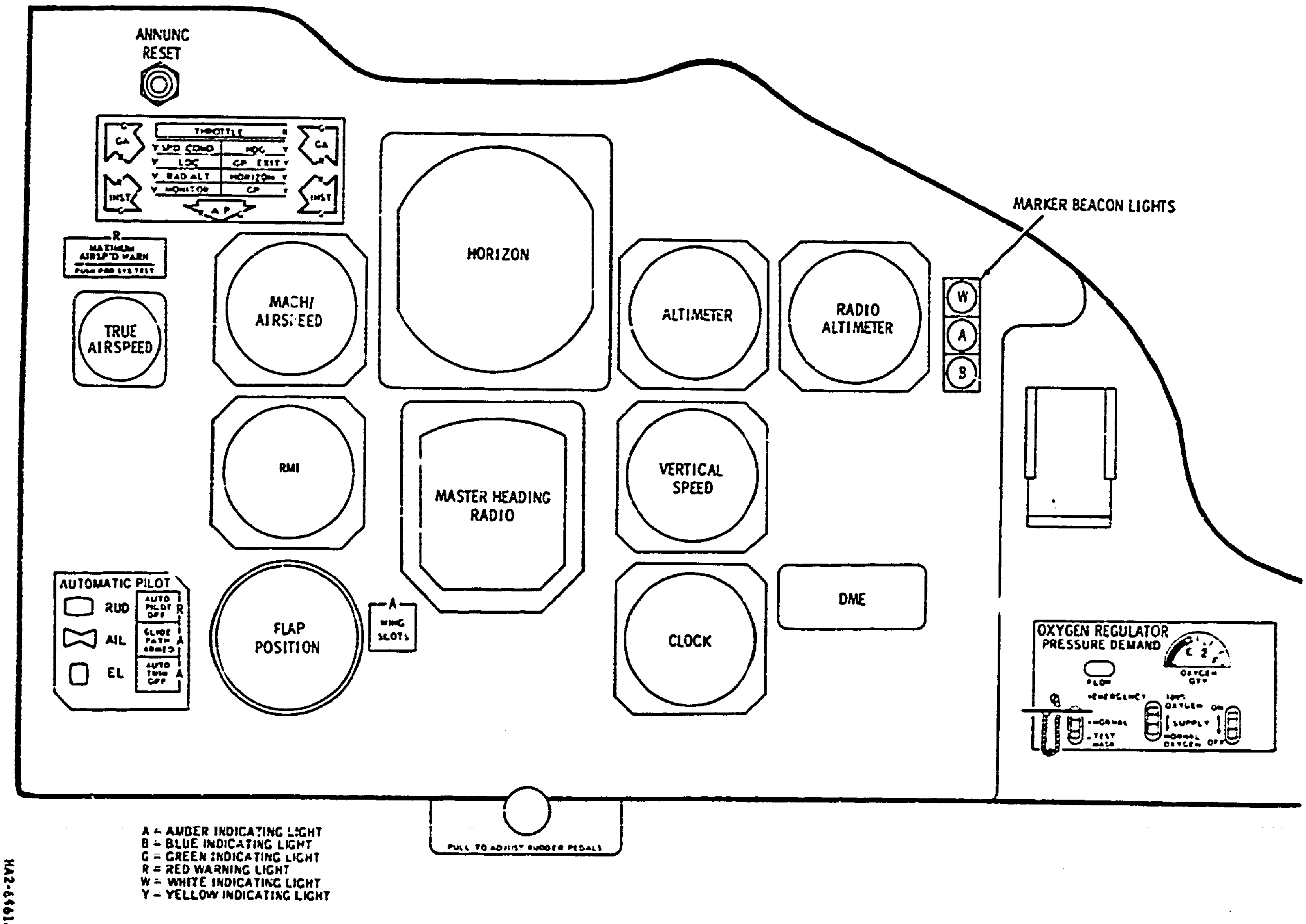
1A2-5609

First Officer's Instrument Panel
Figure 1

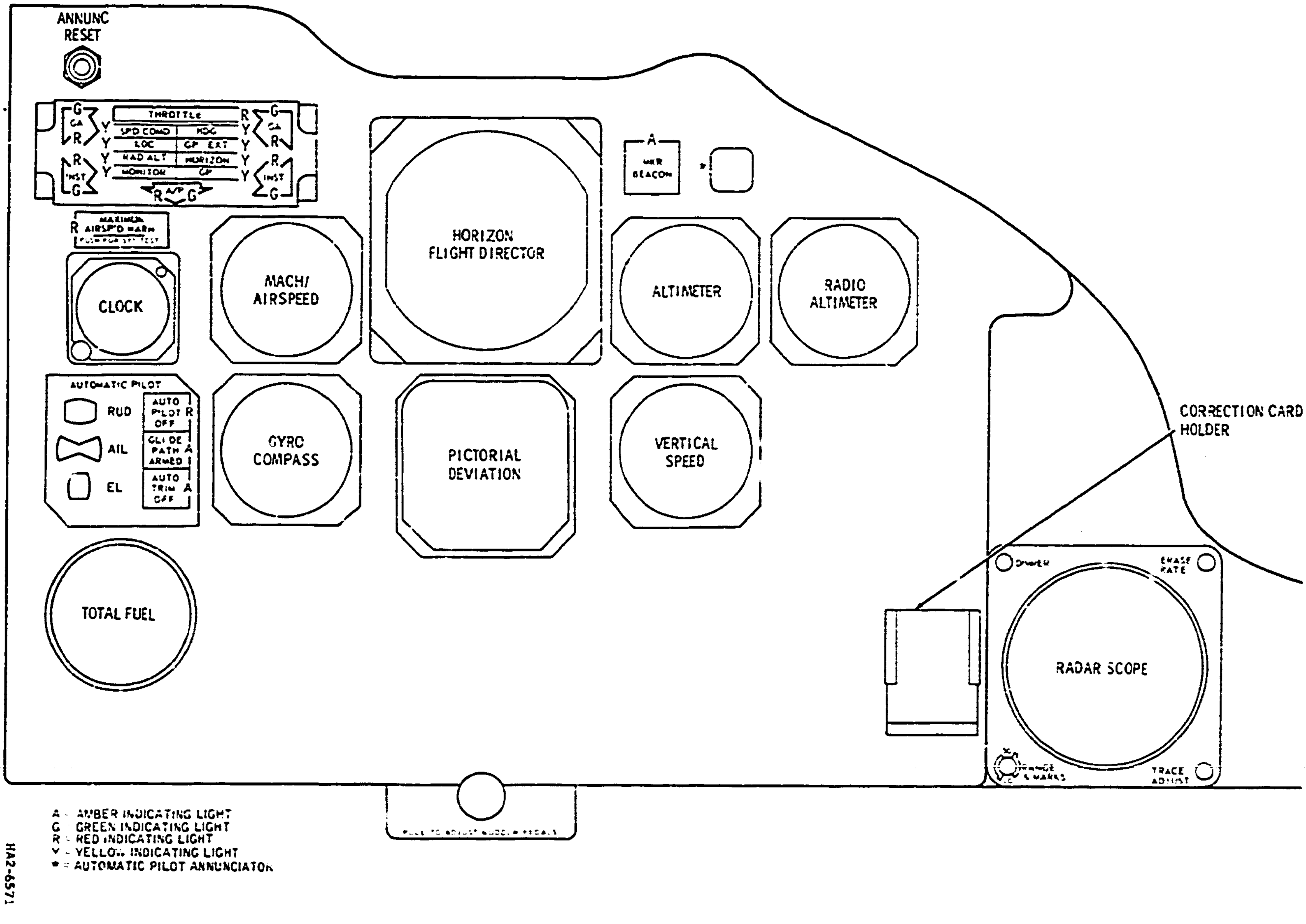


First Officer's Flight Instrument Panel
Figure 1

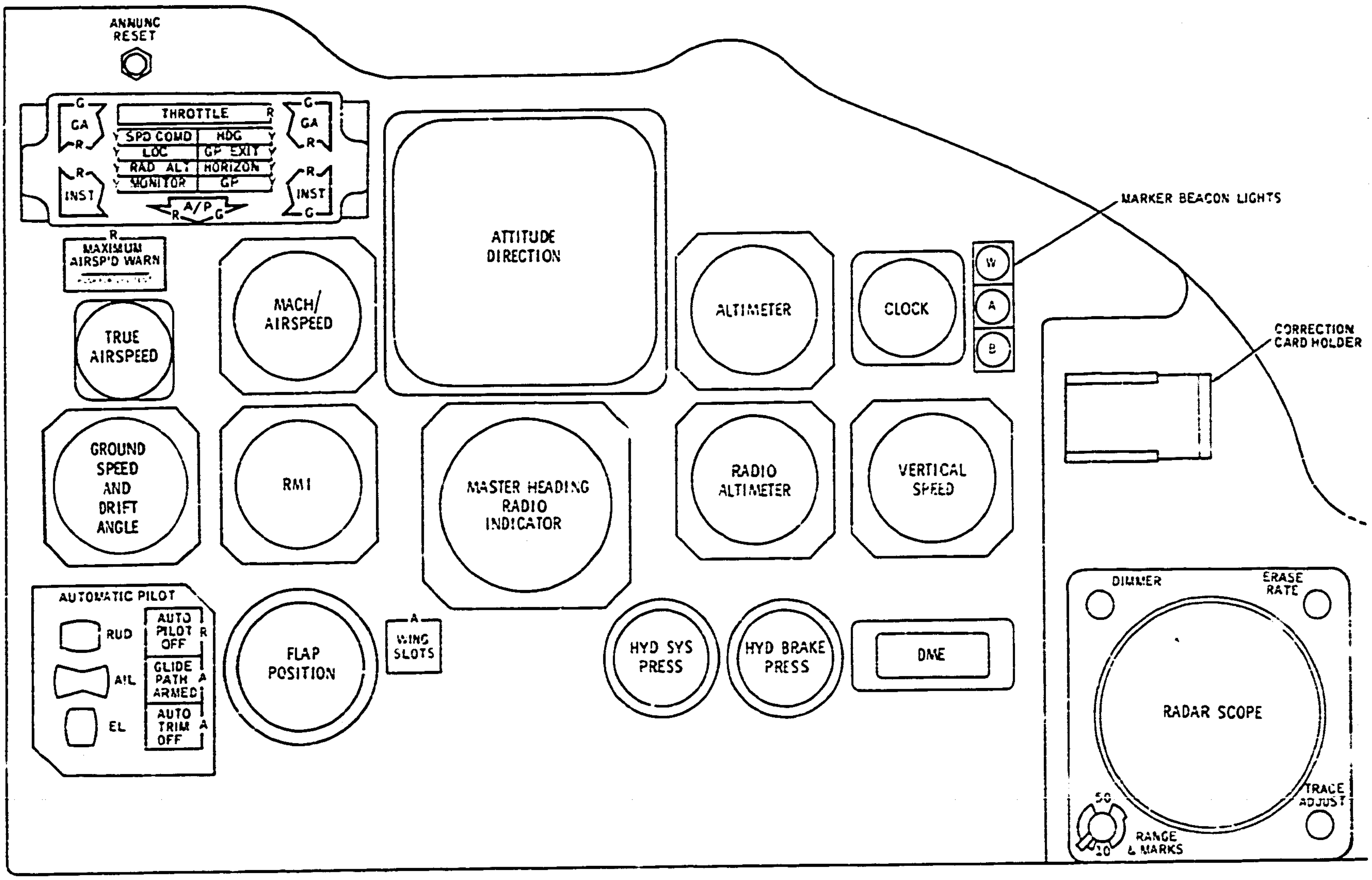
Printed in U.S.A.



First Officer's Flight Instrument Panel
Figure 1



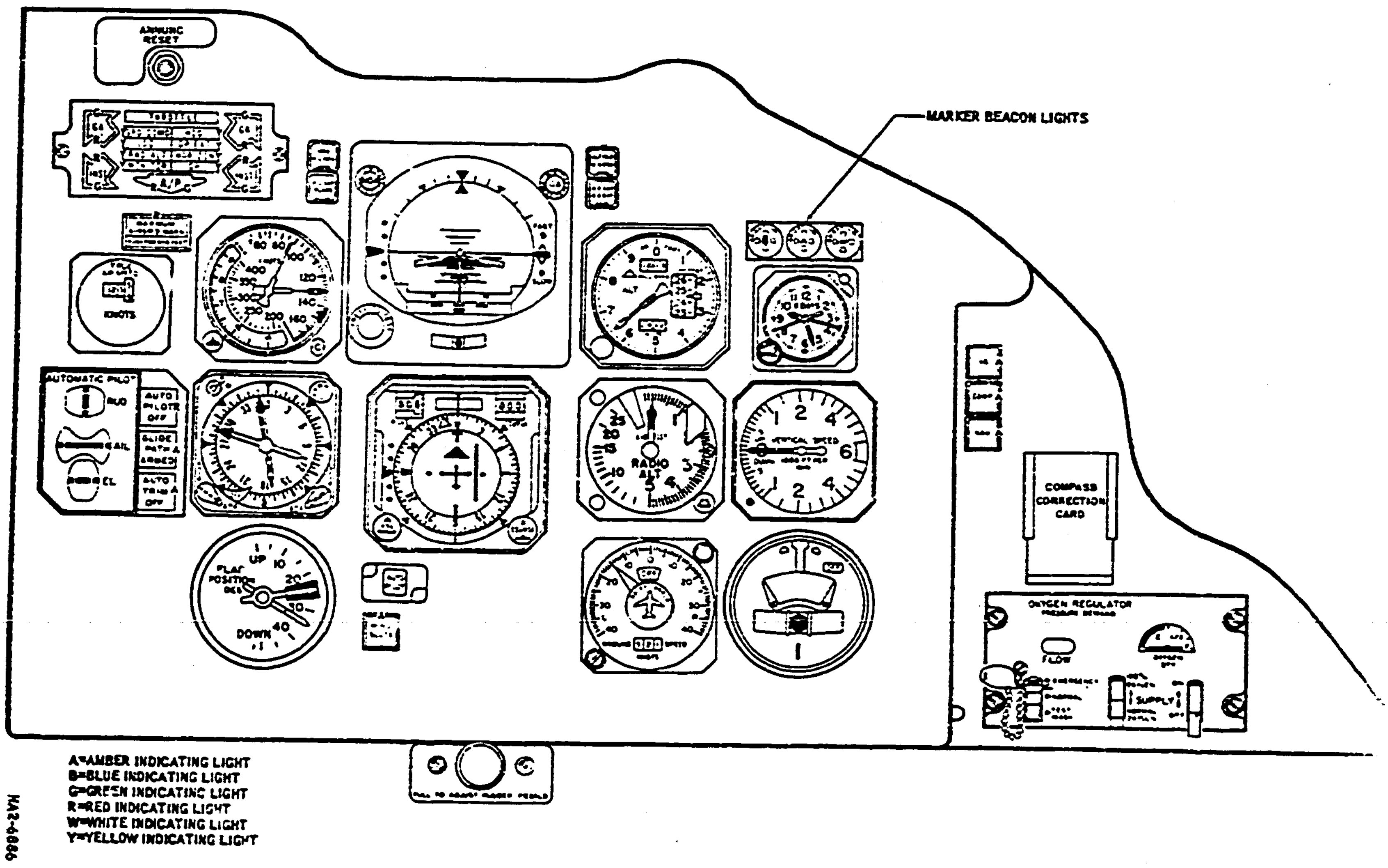
First Officer's Flight Instrument Panel
Figure 1



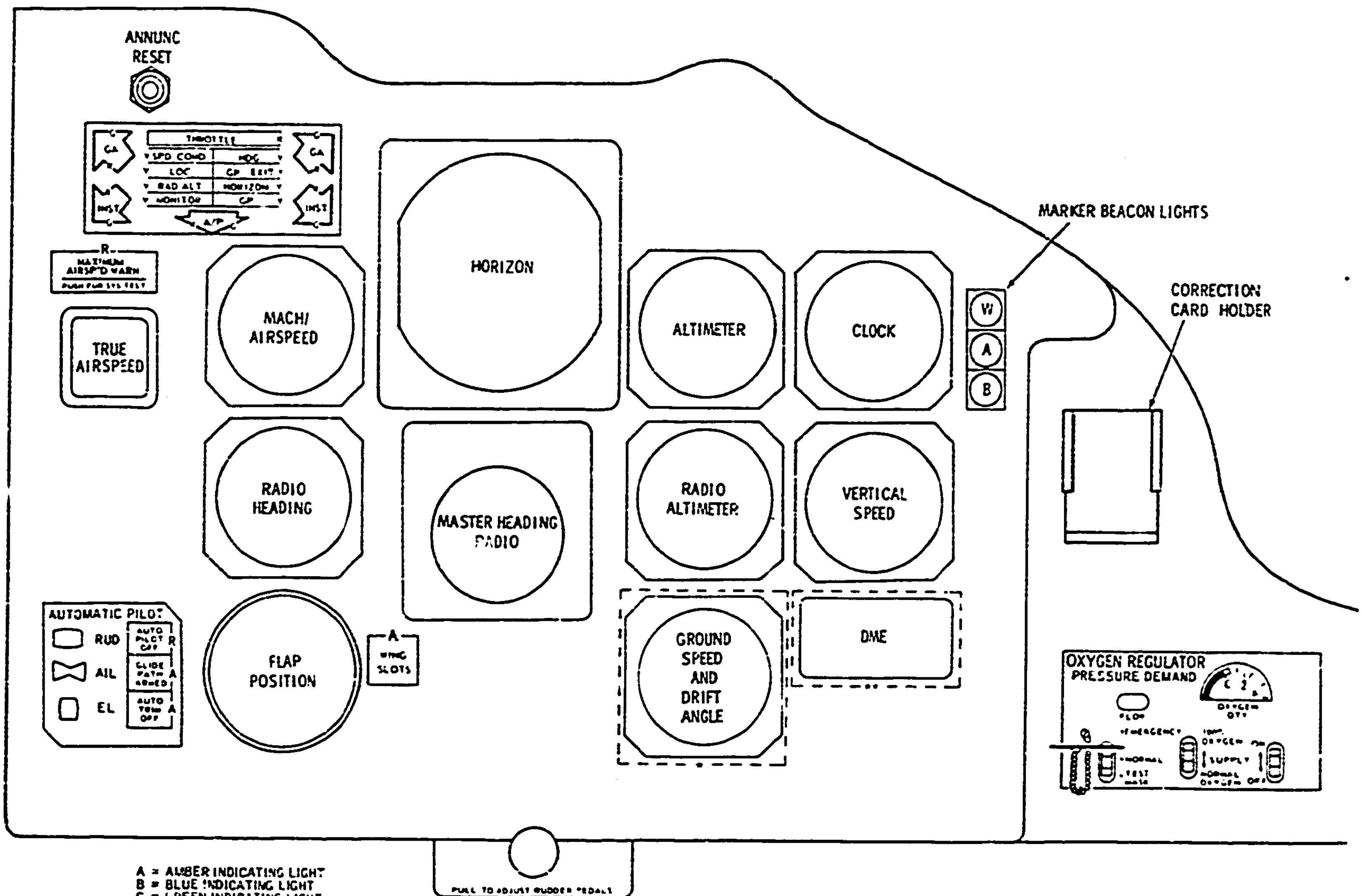
A - AMBER INDICATING LIGHT
B - BLUE INDICATING LIGHT
G - GREEN INDICATING LIGHT
R - RED WARNING LIGHT
W - WHITE INDICATING LIGHT
Y - YELLOW INDICATING LIGHT

HA2-6593

First Officer's Flight Instrument Panel
Figure 1



First Officer's Flight Instrument Panel
Figure 1

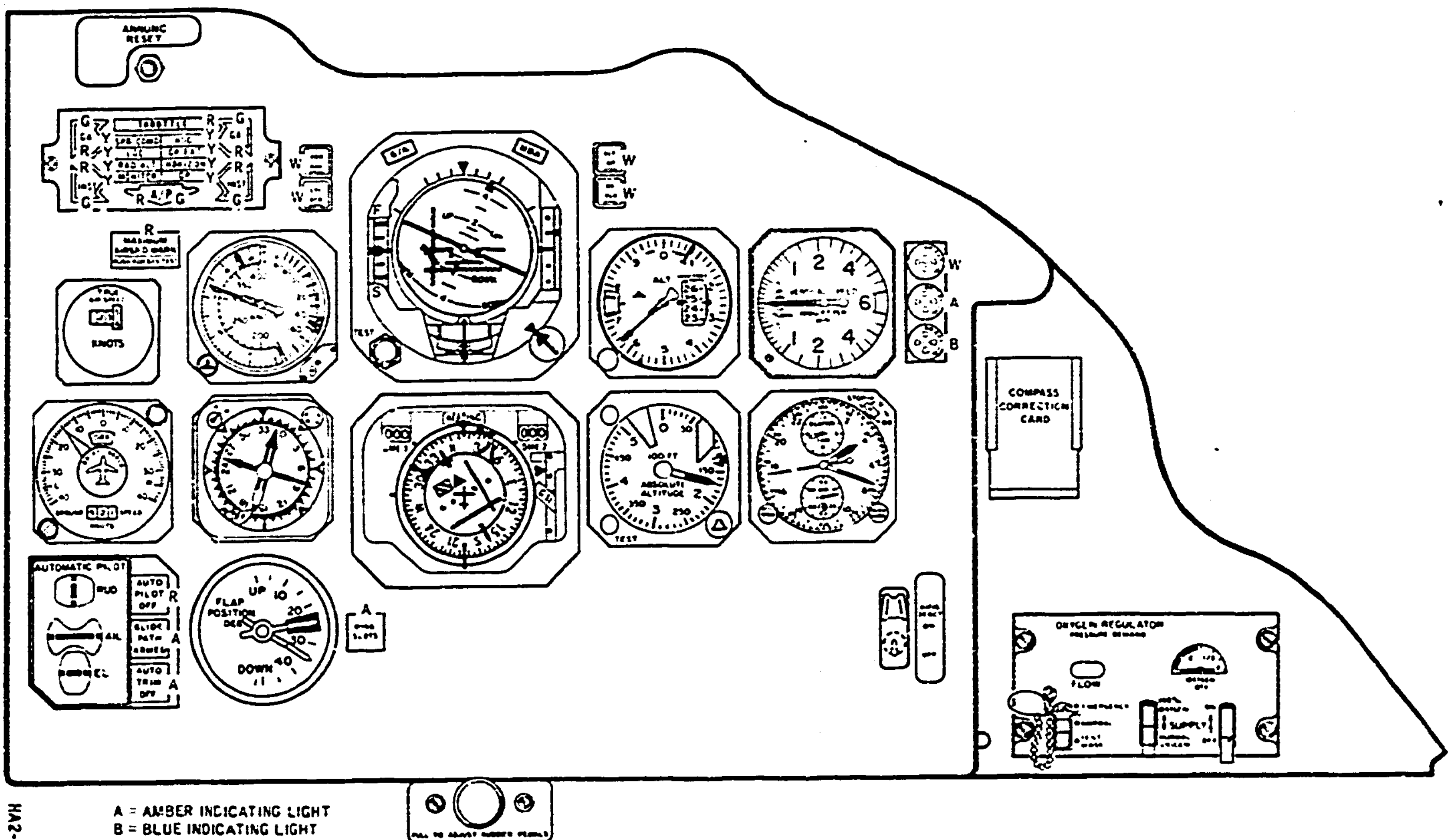


A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT
R = RED WARNING LIGHT
W = WHITE INDICATING LIGHT
Y = YELLOW INDICATING LIGHT
*NOT INSTALLED ON N863F
**INSTALLED ON 46112

HA2-7081

First Officer's Flight Instrument Panel
Figure 1

Printed in U.S.A.



HA2-7183

A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT
R = RED WARNING LIGHT
W = WHITE INDICATING LIGHT
Y = YELLOW INDICATING LIGHT

First Officer's Flight Instrument Panel
Figure 1

FIRST OFFICER'S FLIGHT INSTRUMENT PANEL - MAINTENANCE PRACTICES

1. General

A. In order to remove the first officer's flight instrument panel, it is necessary to remove all power from the airplane and to disconnect all electrical connectors and hoses from the instruments.

B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation First Officer's Flight Instrument Panel

A. Remove Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

(2) Secure control column in full aft position.

(3) Inspect instruments for properly secured mounting.

(4) Loosen five quick-release fasteners from panel frame.

(5) Tilt panel down.

CAUTION: MAKE CERTAIN THAT AREA IS CLEARED TO PREVENT DAMAGE TO INSTRUMENTS WHEN PANEL IS TILTED DOWN.

(6) Disconnect electrical connectors and lines.

(7) Tag and cap all hoses, ports, and electrical connectors.

(8) Lift panel up.

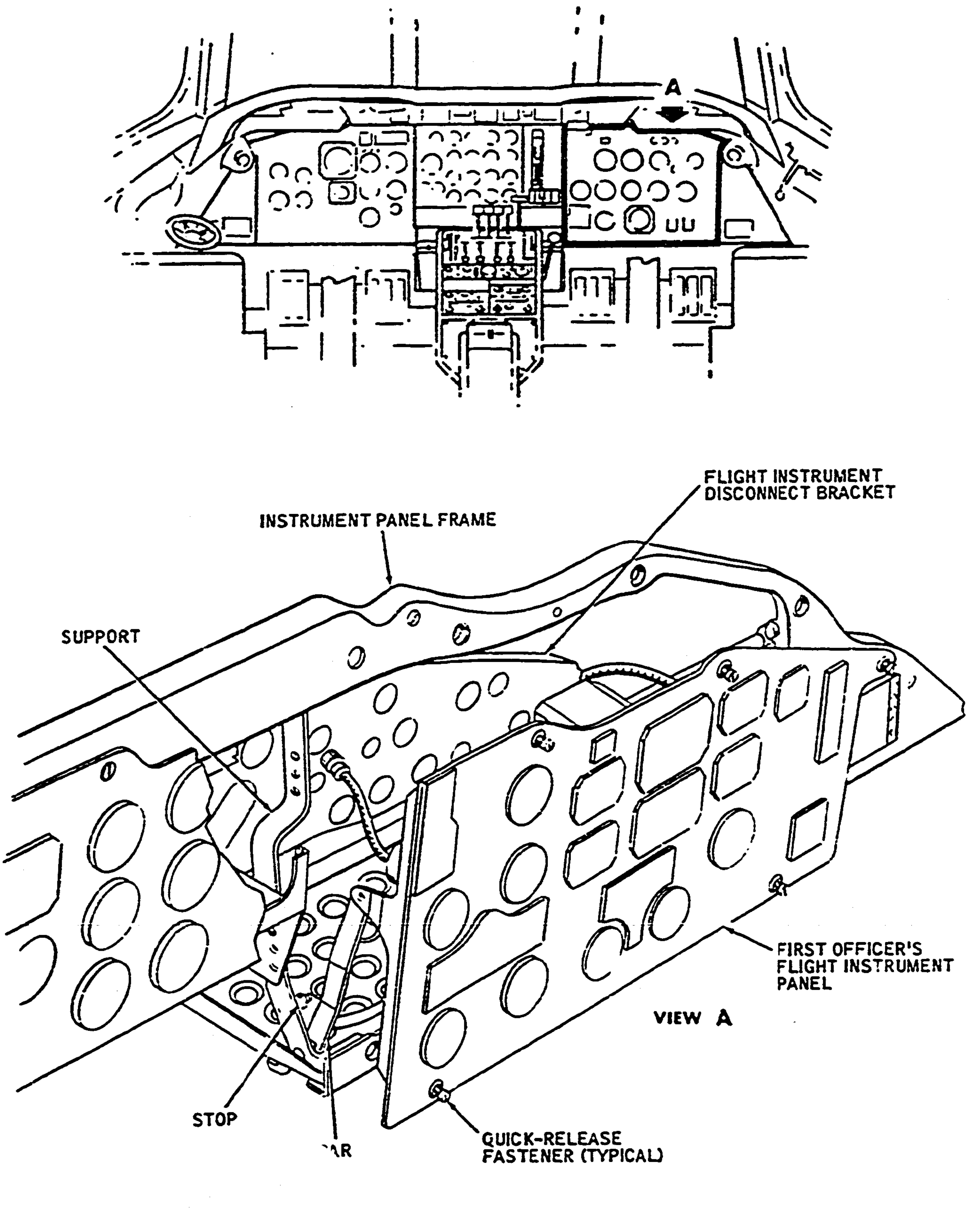
NOTE: The lifting motion shifts the pivot and displaces the bar assembly from the frame.

(9) Carefully pull panel aft and remove from cavity.

B. Install Panel

(1) Verify power is removed from airplane.

(2) Check that all indicators are securely clamped in [illegible]el.



HA2-1295

First Officer's Flight Instrument
Panel Replacement
Figure 201

Printed in U.S.A.

(3) Carefully place panel in cavity, tilted down; slide panel forward and guide bars into frame.

(4) Remove all caps and connect electrical and hose connections.

(5) Swing panel into upright position, support panel, and secure five quick-release fasteners.

(6) Perform operational test of all systems involved to determine integrity of new installation.

FIRST OFFICER'S FLIGHT INSTRUMENT PANEL - MAINTENANCE PRACTICES

1. General

A. In order to remove the first officer's flight instrument panel, it is necessary to remove all power from the airplane and to disconnect all electrical connectors and hoses from the instruments.

B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation First Officer's Flight Instrument Panel

A. Remove Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

(2) Secure control column in full aft position.

(3) Make certain that all installed instruments are securely clamped in panel.

(4) Loosen five quick-release fasteners from panel frame.

(5) Depress the hinged safety stop located on glareshield.

(6) Tilt panel down.

CAUTION: MAKE CERTAIN THAT AREA IS CLEARED TO PREVENT DAMAGE TO INSTRUMENTS WHEN PANEL IS TILTED DOWN.

(7) Disconnect electrical connectors and lines.

(8) Tag and cap all hoses, ports, and electrical connectors.

(9) Lift panel up and disengage pin-and-slotted-hook supports at each side of panel cavity.

NOTE: The lifting motion shifts the pivot and displaces the bar assembly from the frame.

(10) Carefully pull panel aft and remove from cavity.

B. Install Panel

(1) Verify power is removed from airplane.

(2) Check that all indicators are securely clamped in panel.

(3) Carefully place panel in cavity, tilted down. Slide panel forward and engage pin-and-slotted-hook supports.

(4) Remove all caps and connect electrical and hose connections.

(5) Depress hinged safety stop on glareshield and swing panel into position.

(6) Support panel, and secure five quick-release fasteners.

(7) Perform operational test of all systems involved to determine integrity of new installation.

FIRST OFFICER'S FLIGHT INSTRUMENT PANEL - MAINTENANCE PRACTICES

1. General

   A. In order to remove the first officer's flight instrument panel, it is necessary to remove all power from the airplane and to disconnect all electrical connectors and hoses from the instruments.

   B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation First Officer's Flight Instrument Panel

   A. Remove Panel

      (1) Remove power from airplane.

      WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

      (2) Secure control column in full aft position.

      (3) Make certain that all installed instruments are securely clamped in panel.

      (4) Loosen five quick-release fasteners from panel frame.

      (5) Retract the spring-loaded safety latch located on the instrument panel mounting frame, above the first officer's flight instrument panel.

      (6) Tilt panel down until it rests against the stops.

      CAUTION: MAKE CERTAIN THAT AREA IS CLEARED TO PREVENT DAMAGE TO INSTRUMENTS WHEN PANEL IS TILTED DOWN.

      (7) Disconnect electrical connectors and lines.

      (8) Tag and cap all hoses, ports, and electrical connectors.

      (9) Lift panel up.

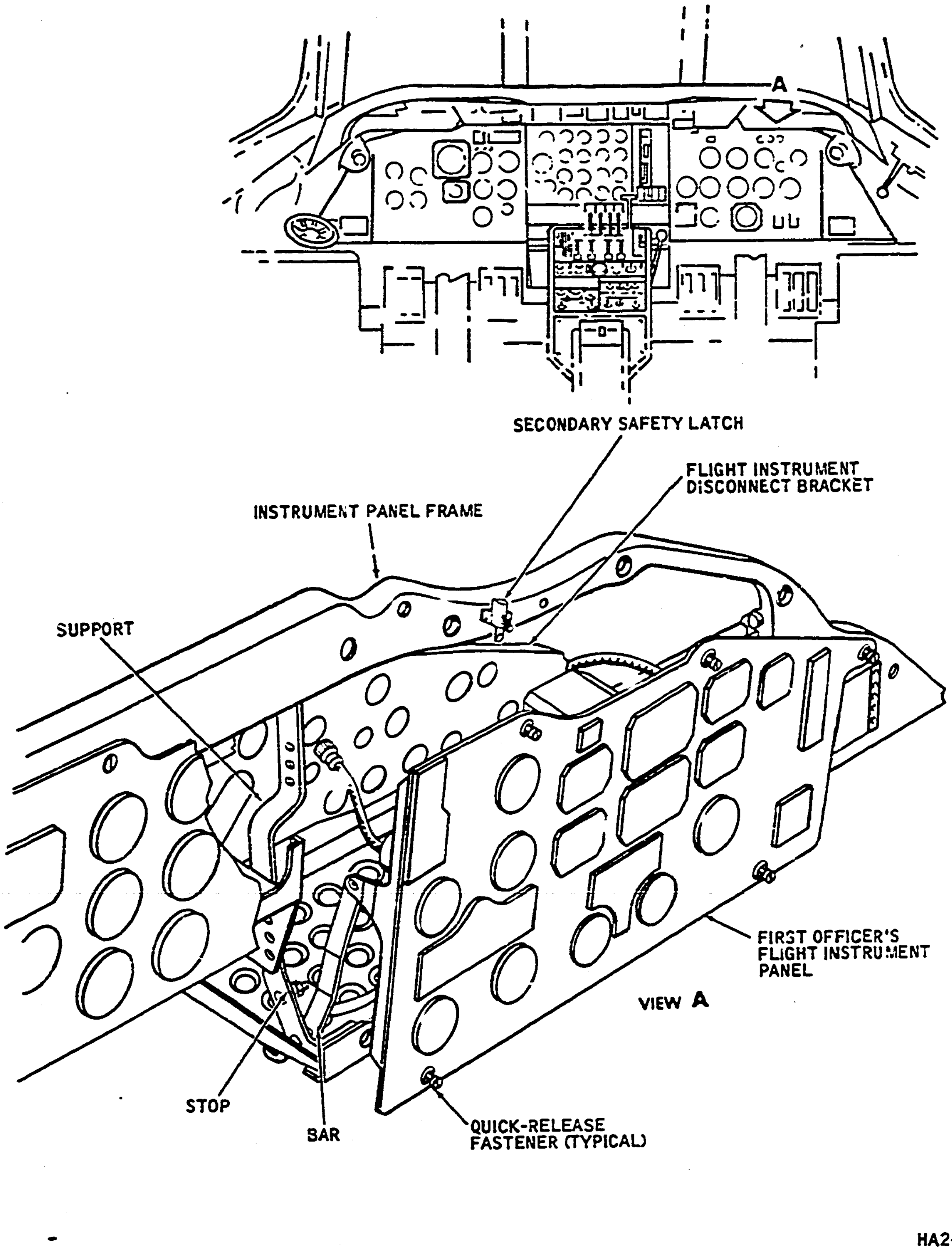
      NOTE: The lifting motion shifts the pivot and displaces the bar assembly from the frame.

      (10) Carefully pull panel aft and remove from cavity.

   B. Install Panel

      (1) Verify power is removed from airplane.

      (2) Check that all indicators are securely clamped in panel.



First Officer's Flight Instrument
Panel Replacement
Figure 201

(3) Carefully place panel in cavity, tilted down; slide panel forward and guide bars into frame.

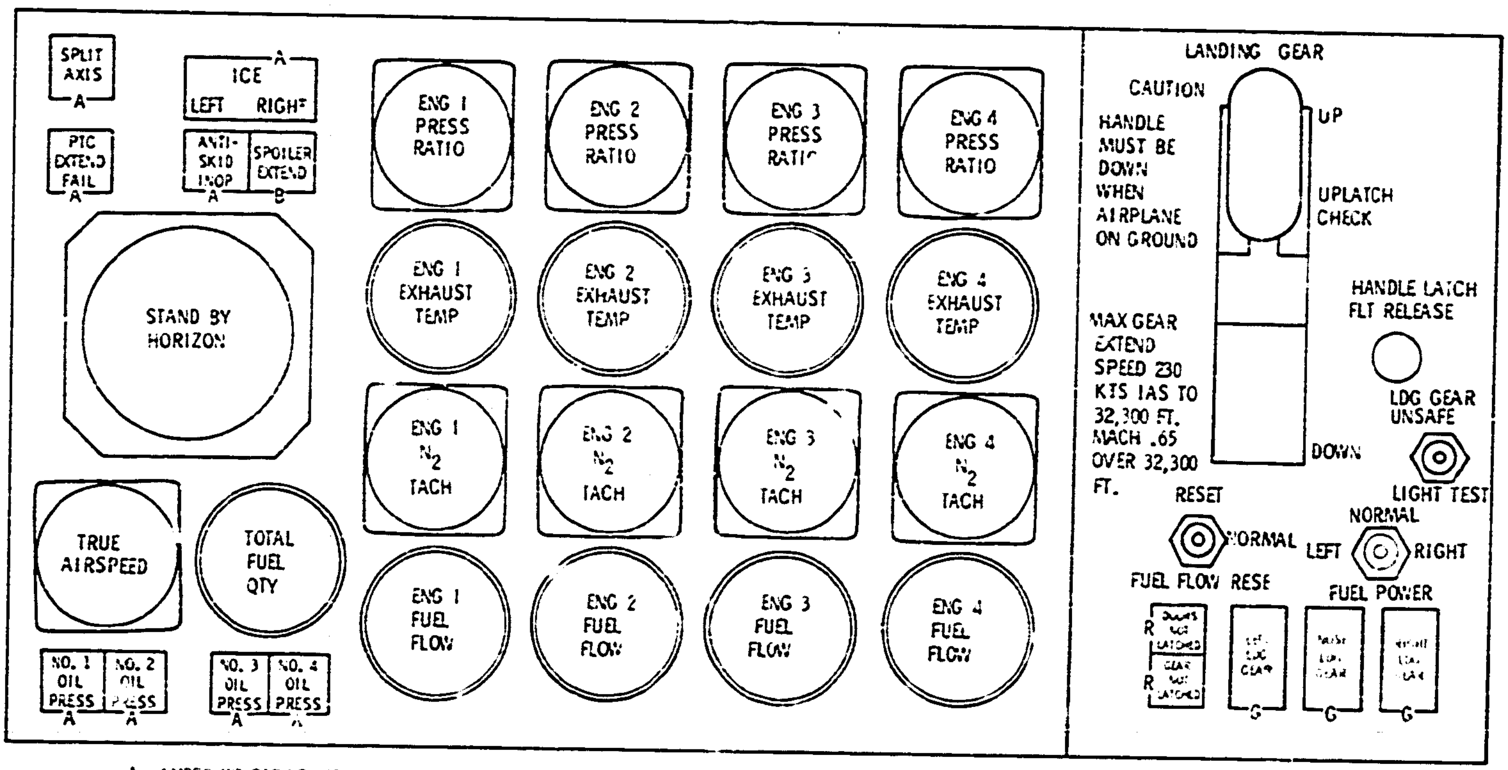
(4) Remove all caps and connect electrical and hose connections.

(5) Retract the spring-loaded safety latch and swing panel into position.

(6) Secure the five quick-release fasteners.

(7) Perform operational test of all systems involved to determine integrity of new installation.

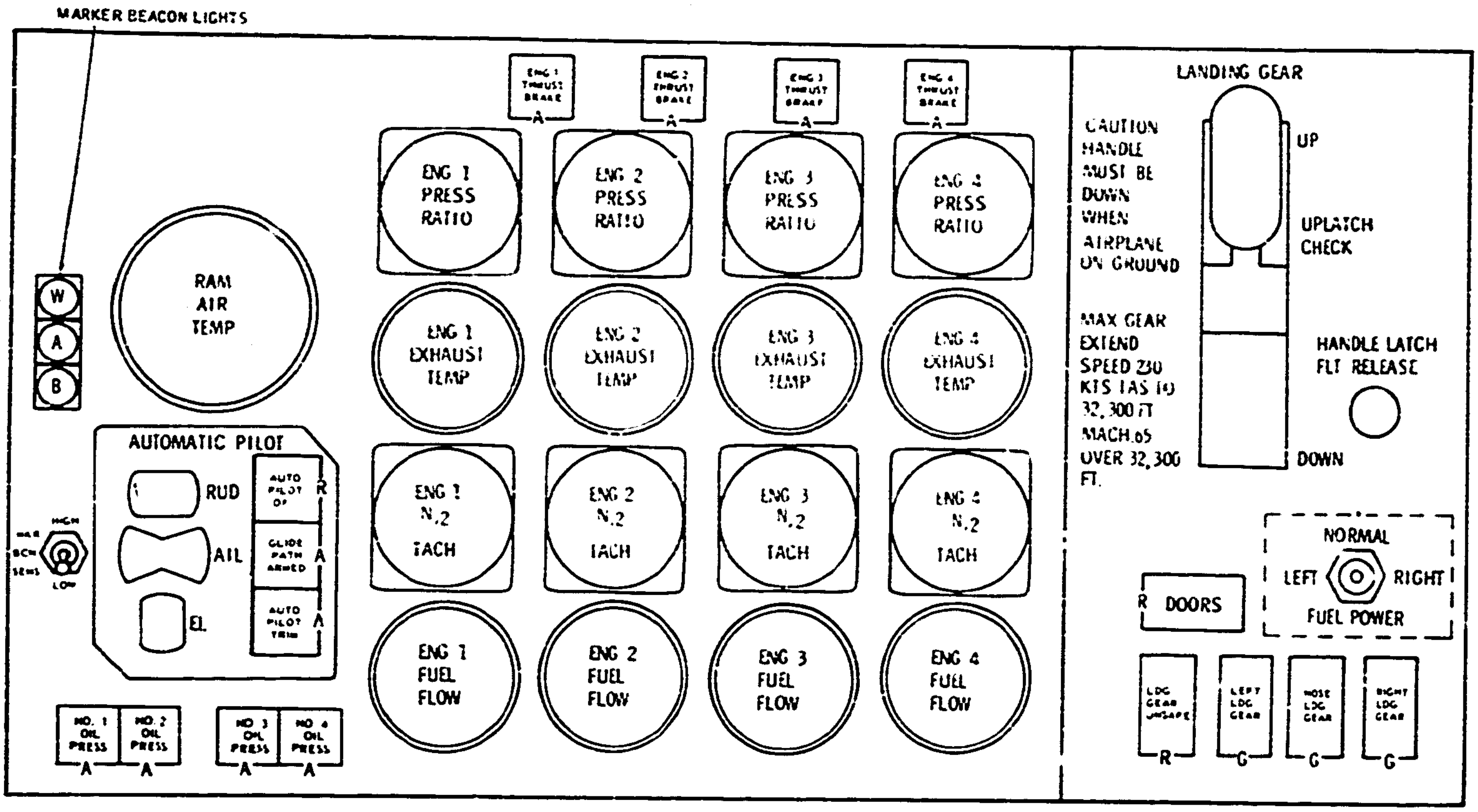
Printed in U.S.A.



A - AMBER INDICATING LIGHT
G - GREEN INDICATING LIGHT
R - RED WARNING LIGHT

IA2-12108

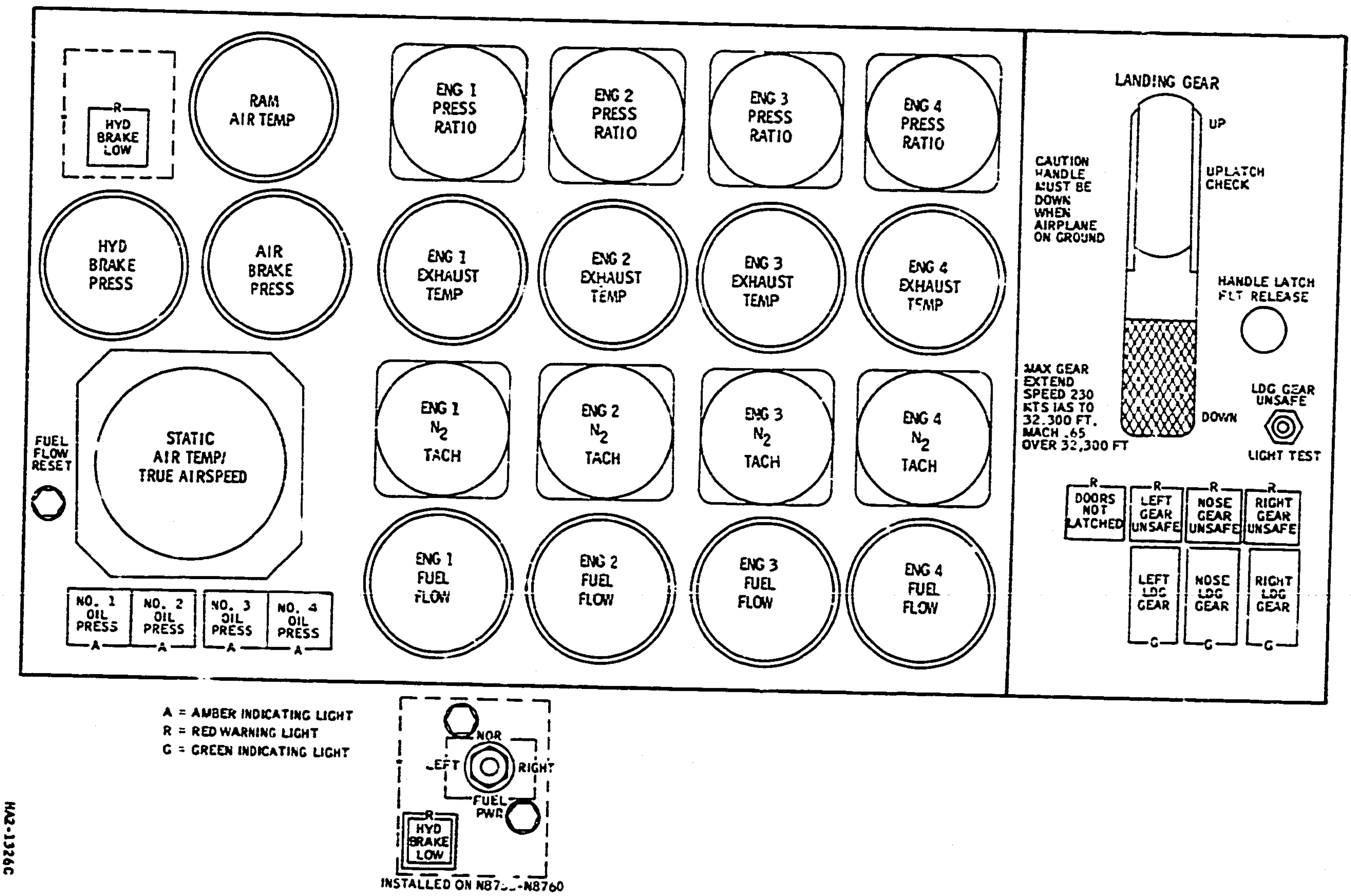
Engine Instrument Panel
Figure 1



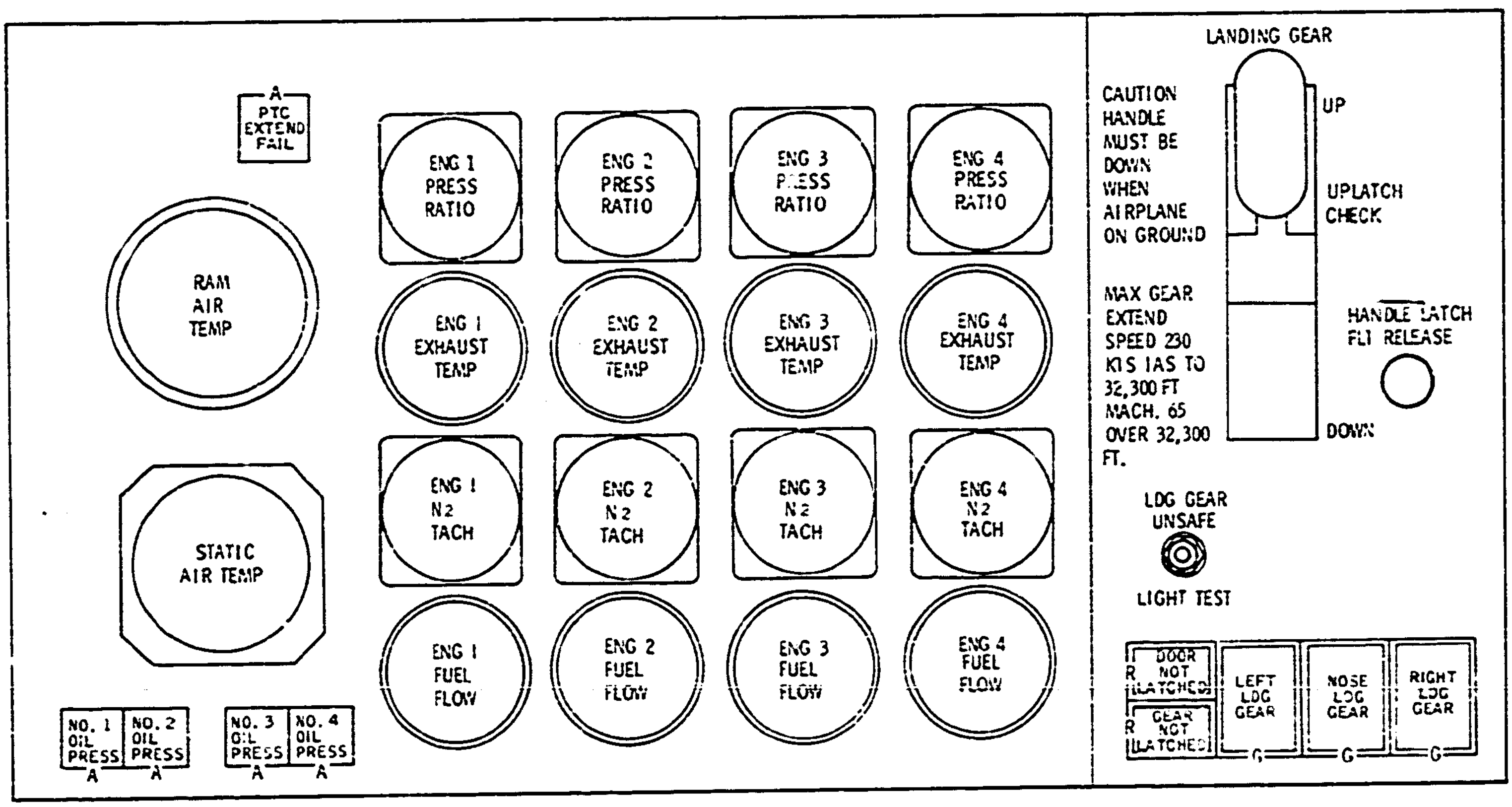
W = WHITE INDICATING LIGHT
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
G = GREEN INDICATING LIGHT
* INSTALLED ON N8966U-N8975U

HA2-1252D

Engine Instrument Panel
Figure 1



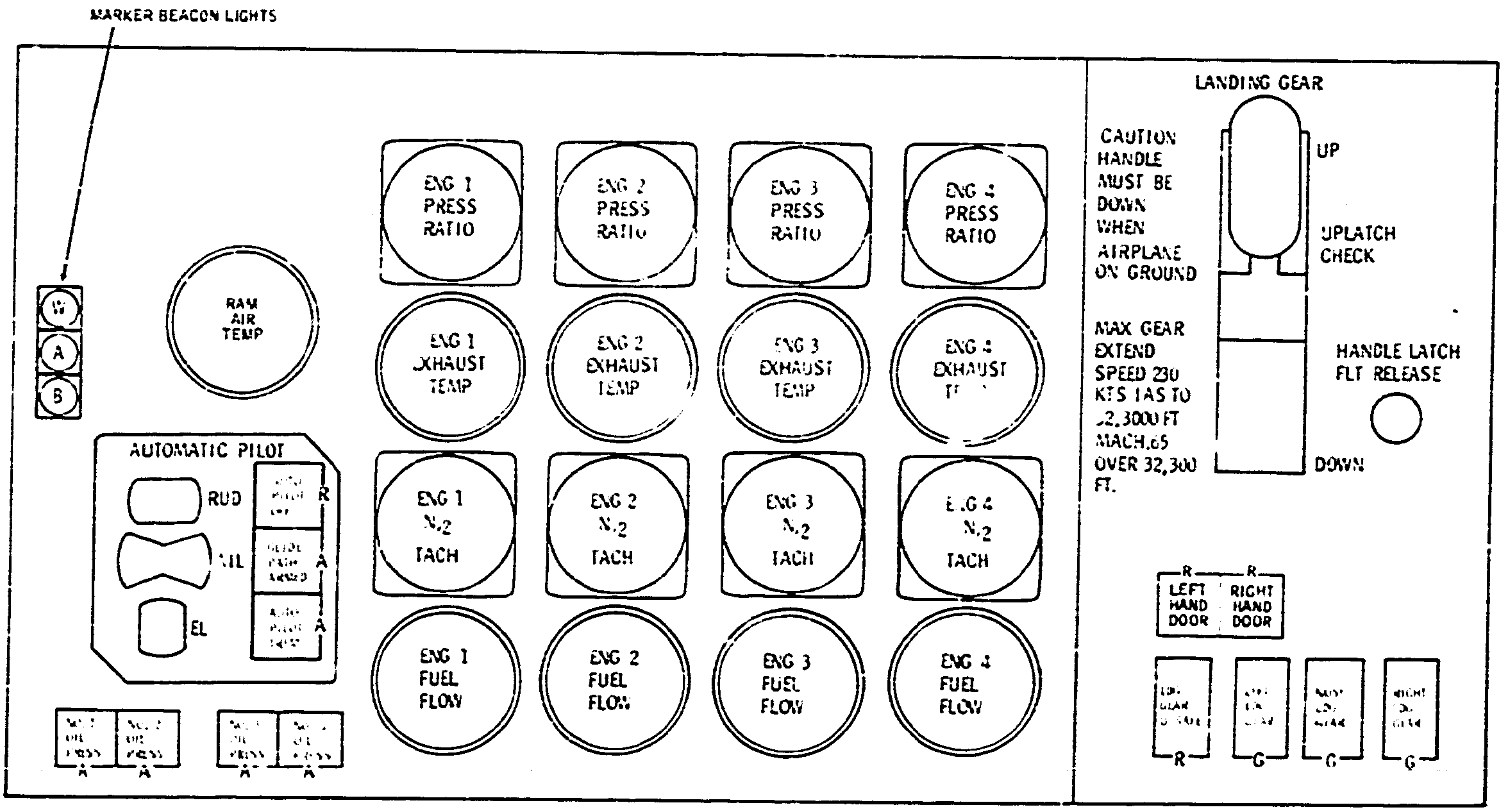
Engine Instrument Panel
Figure 1



A = AMBER INDICATING LIGHT
R = RED WARNING LIGHT
G = GREEN INDICATING LIGHT

HA2-2358A

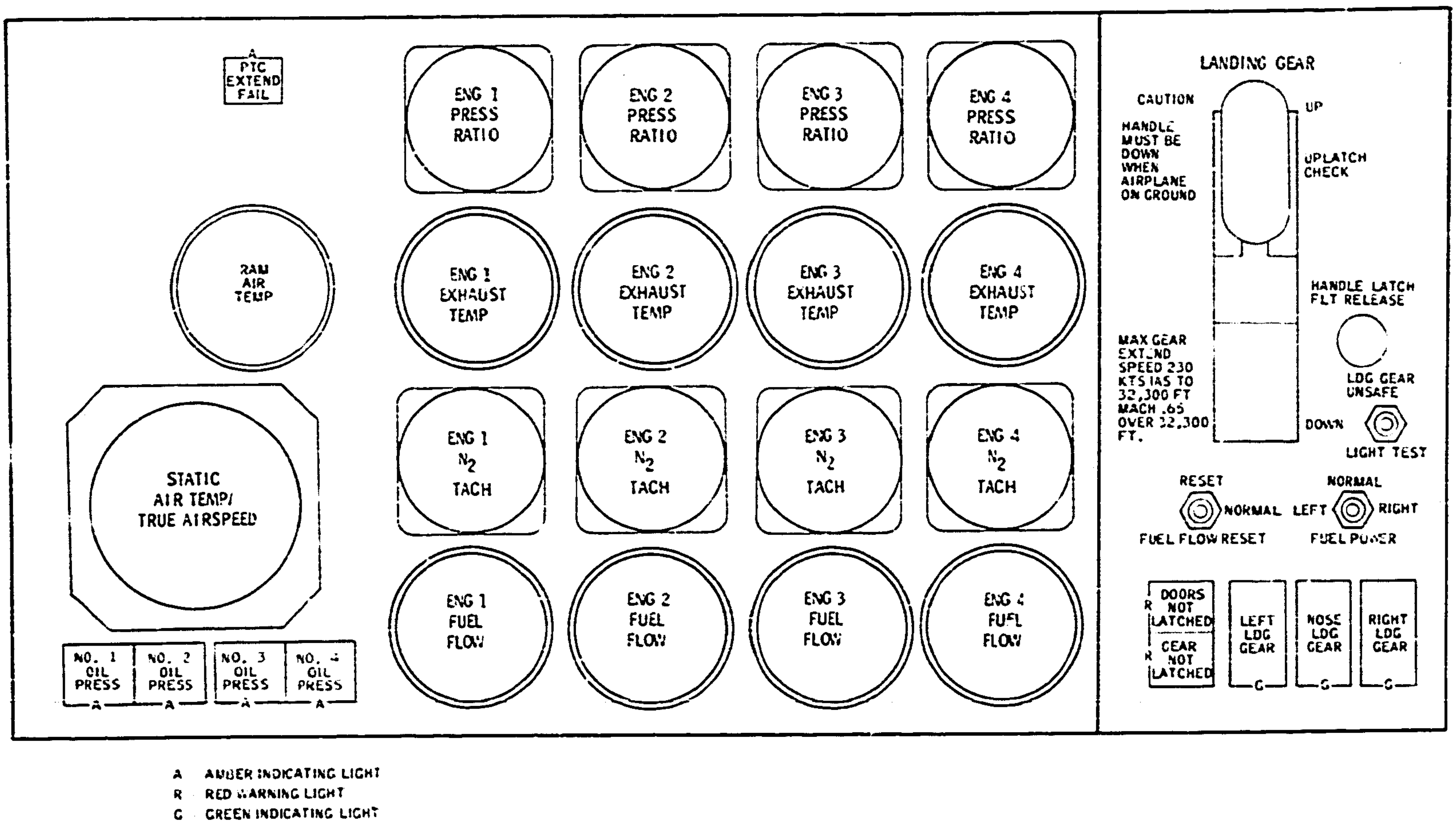
Engine Instrument Panel
Figure 1



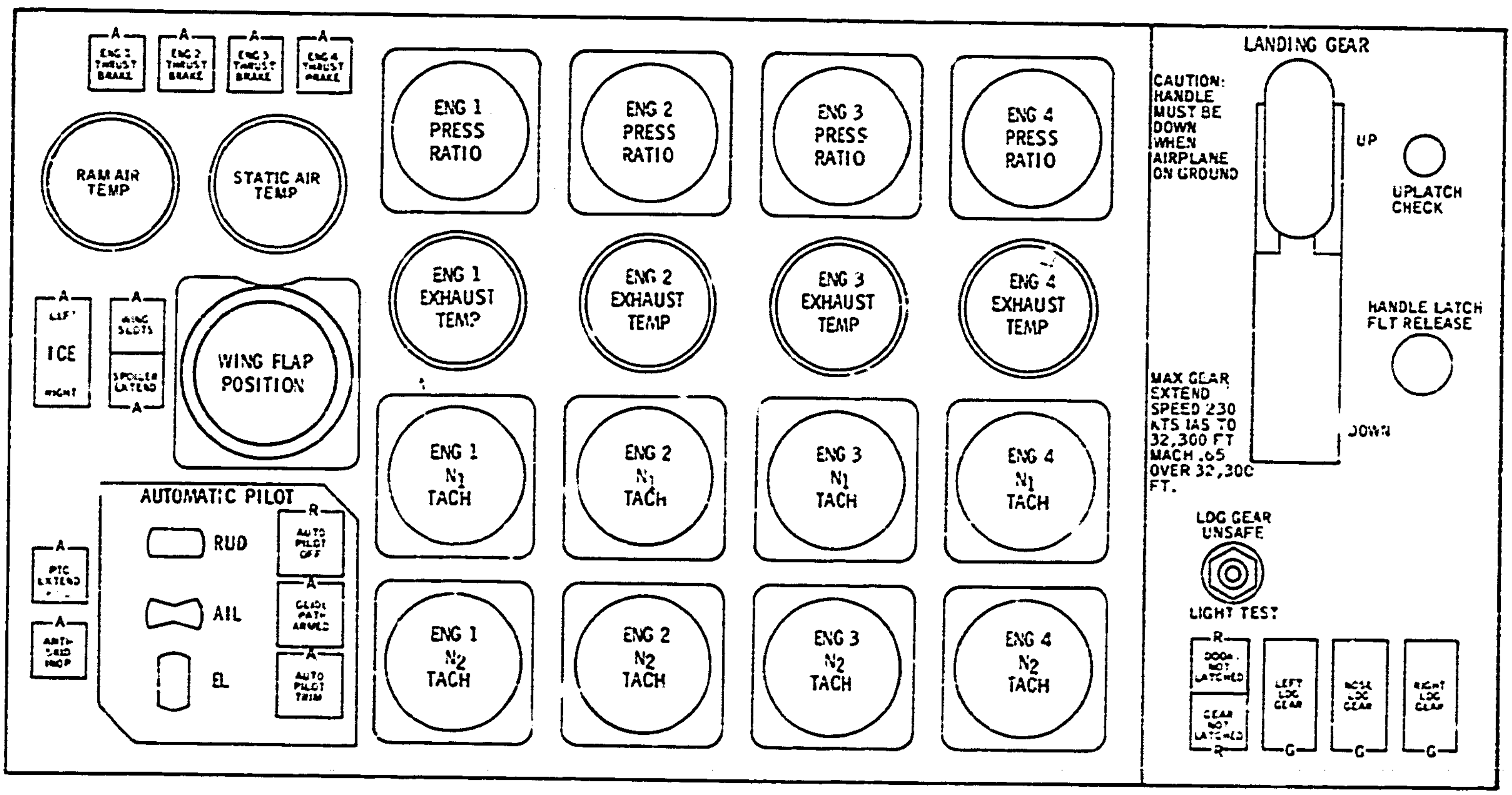
W - WHITE INDICATING LIGHT
A - AMBER INDICATING LIGHT
B - BLUE INDICATING LIGHT
R - RED WARNING LIGHT
G - GREEN INDICATING LIGHT

HA2-2900A

Engine Instrument Panel
Figure 1



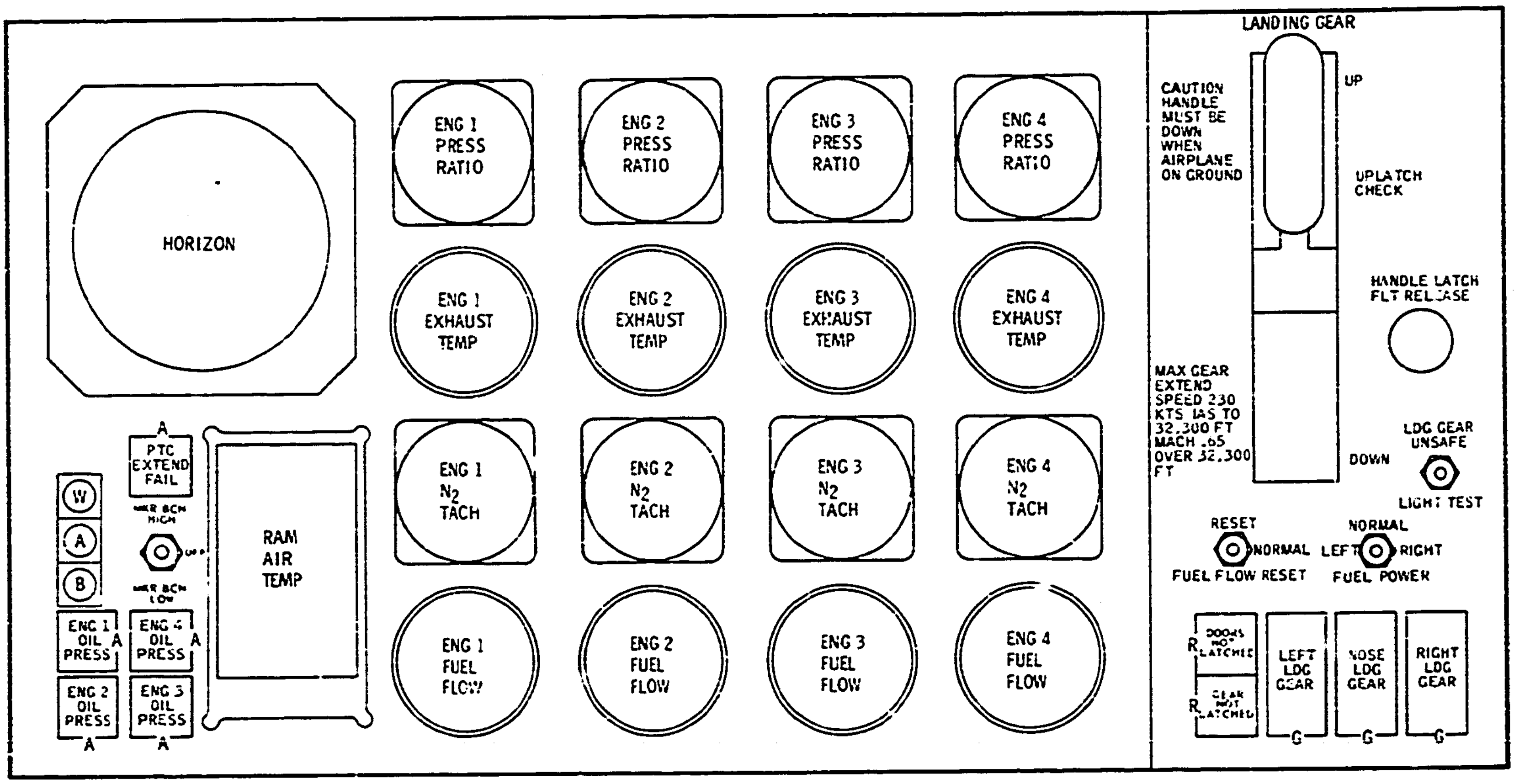
Engine Instrument Panel
Figure 1



A = AMBER INDICATING LIGHT
R = RED WARNING LIGHT
G = GREEN INDICATING LIGHT

HAZ-3050

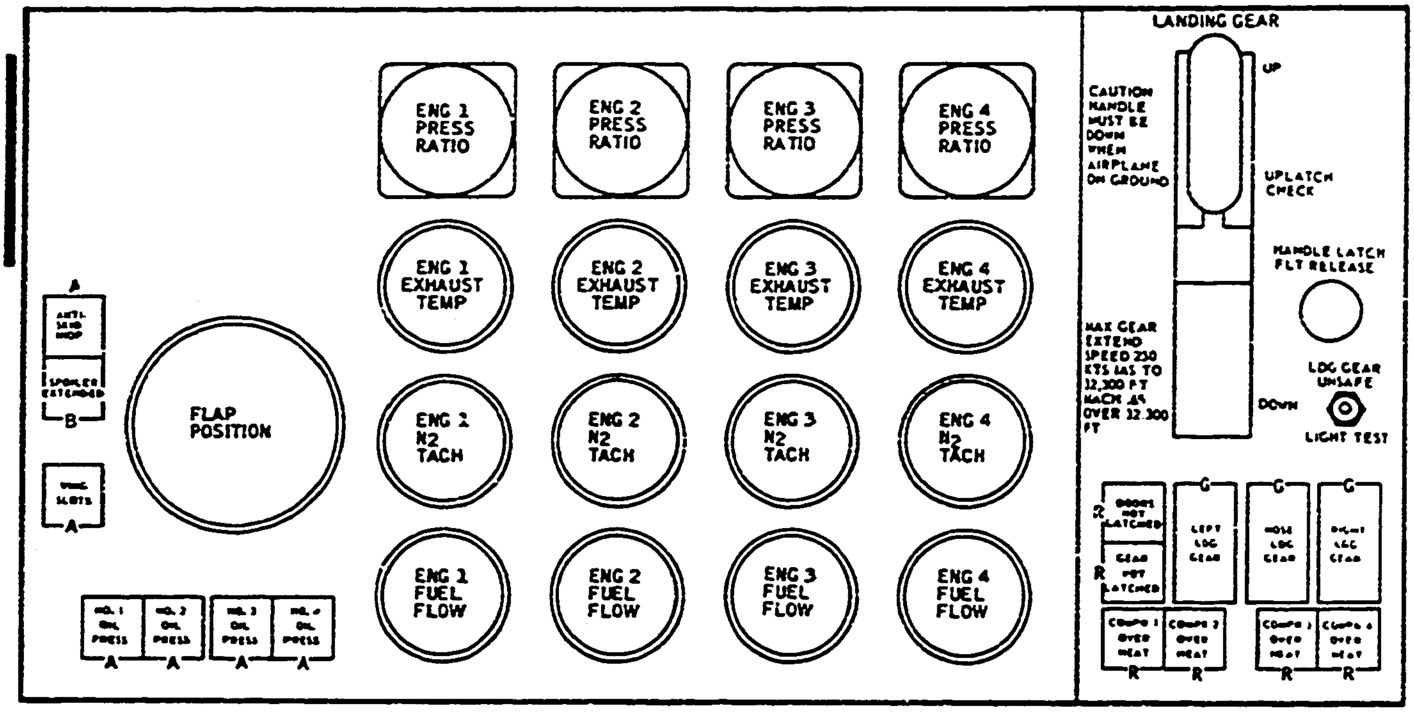
Engine Instrument Panel
Figure 1

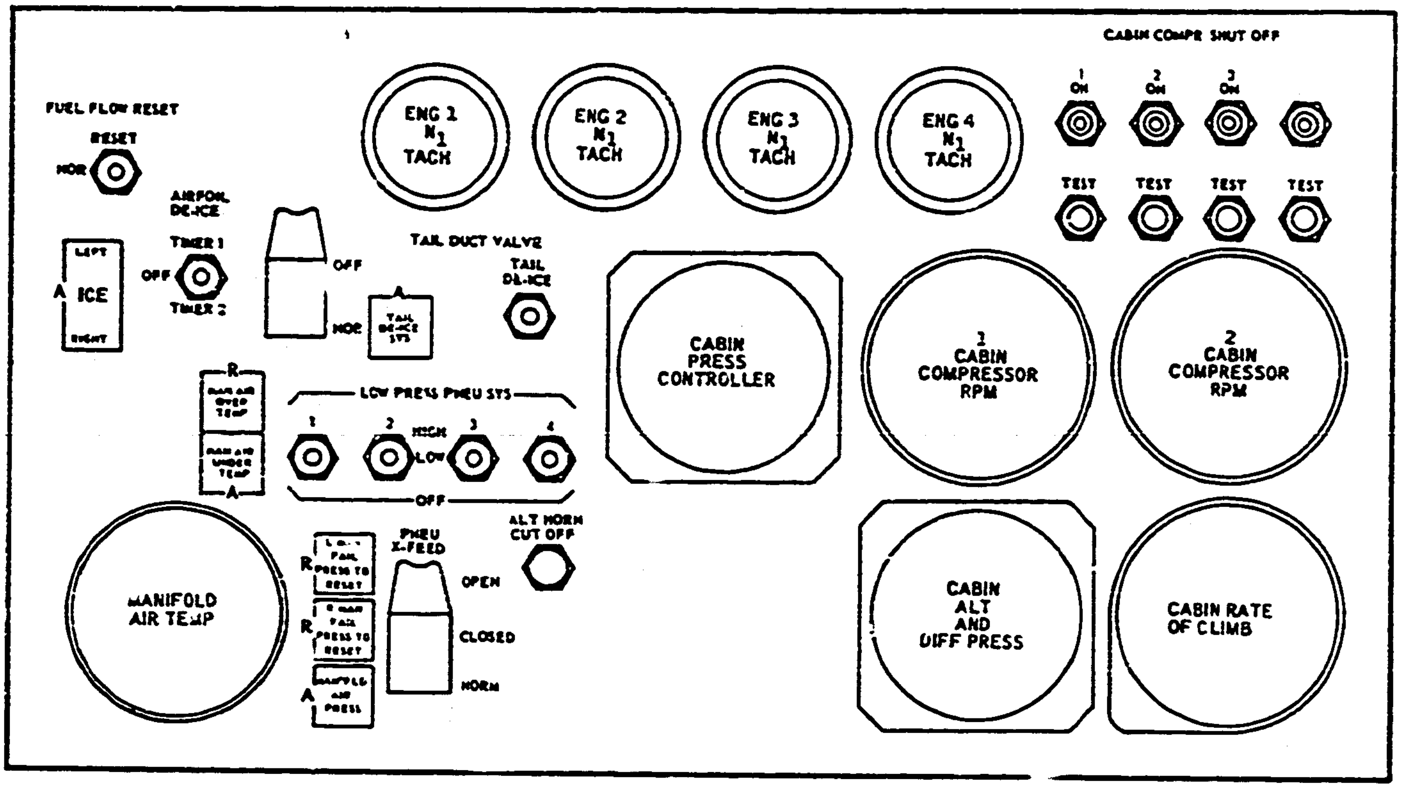


A = AMBER INDICATING LIGHT
R = RED WARNING LIGHT
G = GREEN INDICATING LIGHT
B = BLUE INDICATING LIGHT
W = WHITE INDICATING LIGHT

HA2-3578B

Engine Instrument Panel
Figure 1

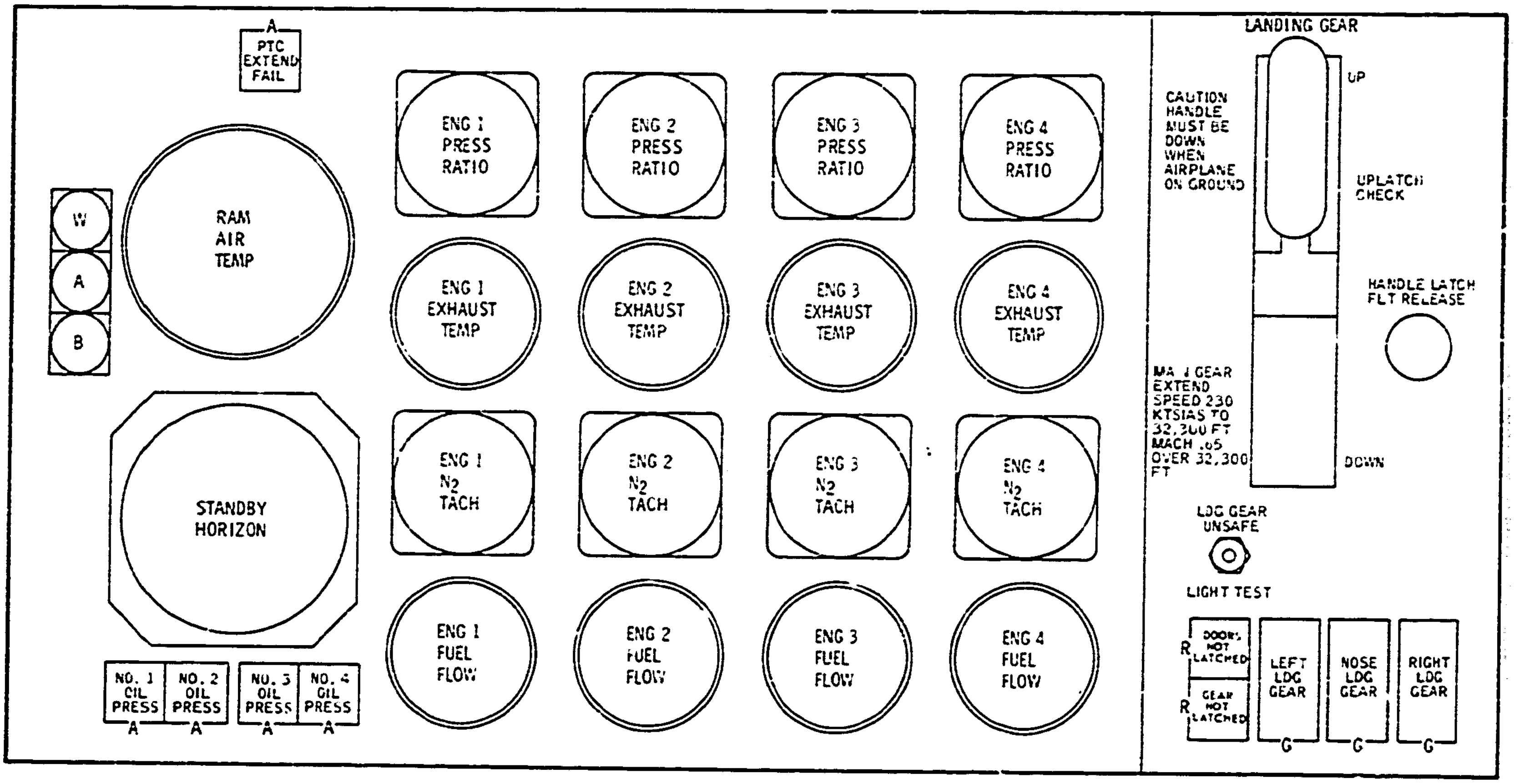




A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT
R = RED INDICATING LIGHT

HA2-3598A

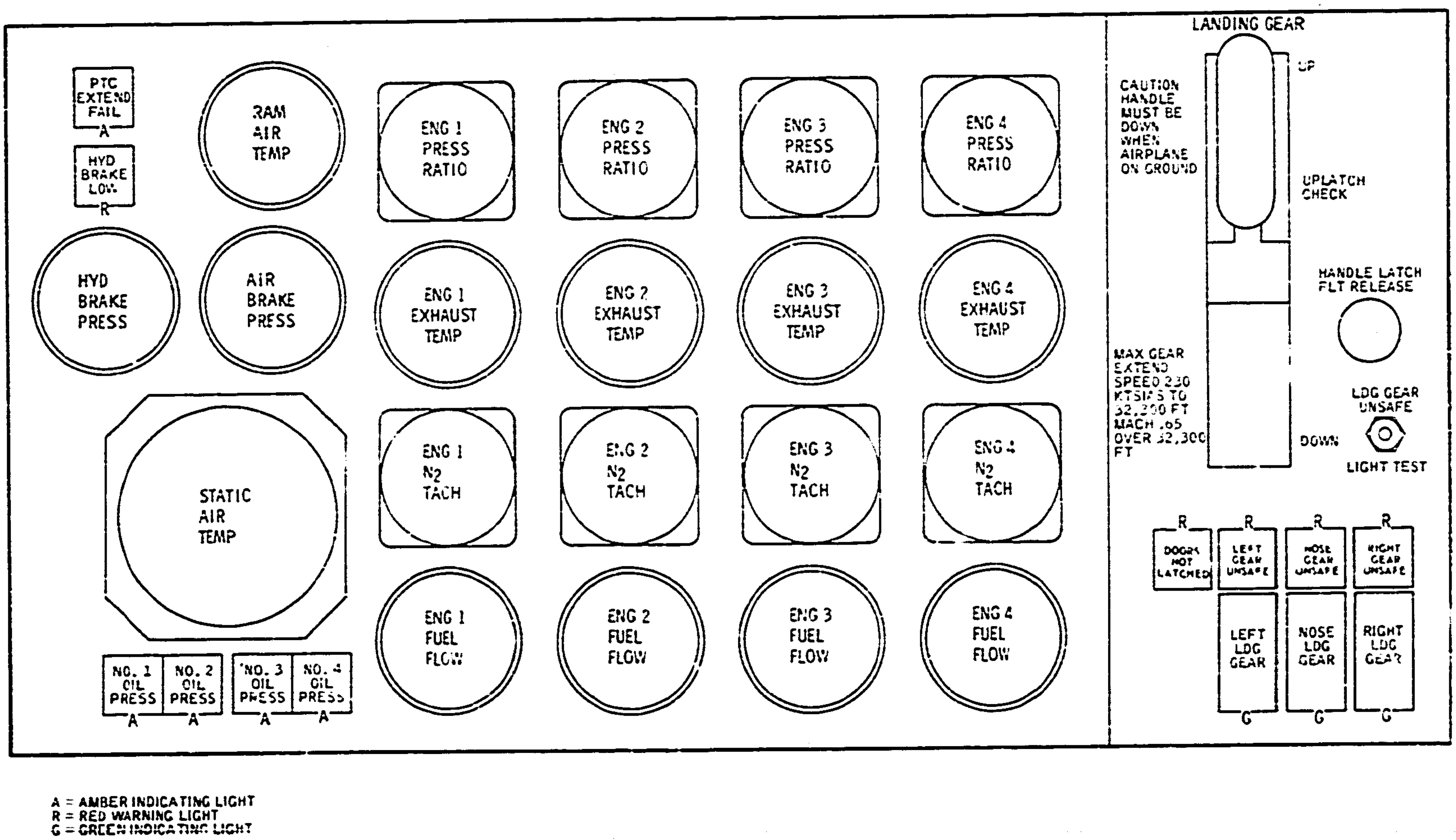
Engine Instrument Panel
Figure 1



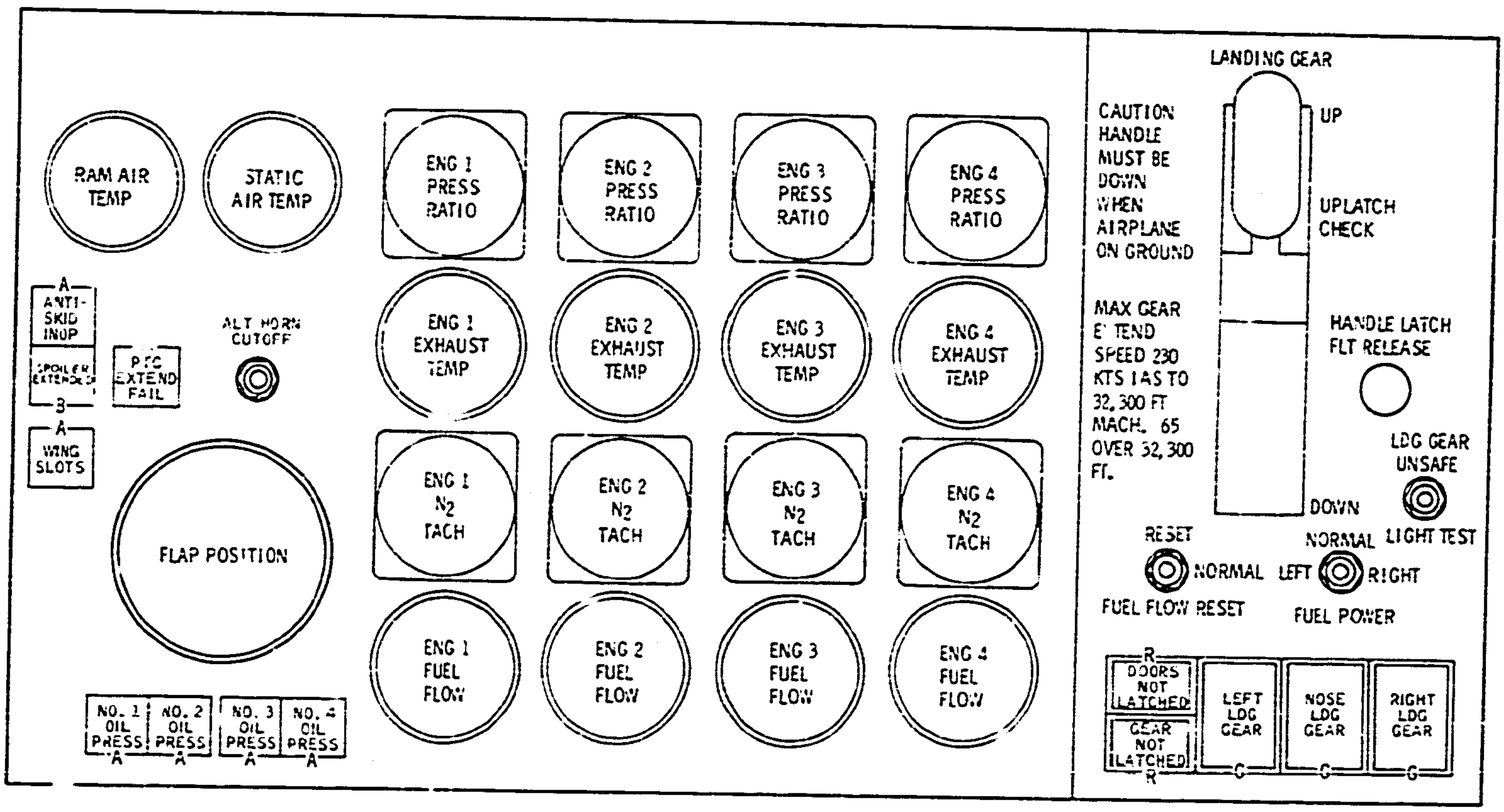
A - AMBER INDICATING LIGHT
R - RED WARNING LIGHT
G - GREEN INDICATING LIGHT
B - BLUE INDICATING LIGHT
W - WHITE INDICATING LIGHT

HA2-3618A

Engine Instrument Panel
Figure 1



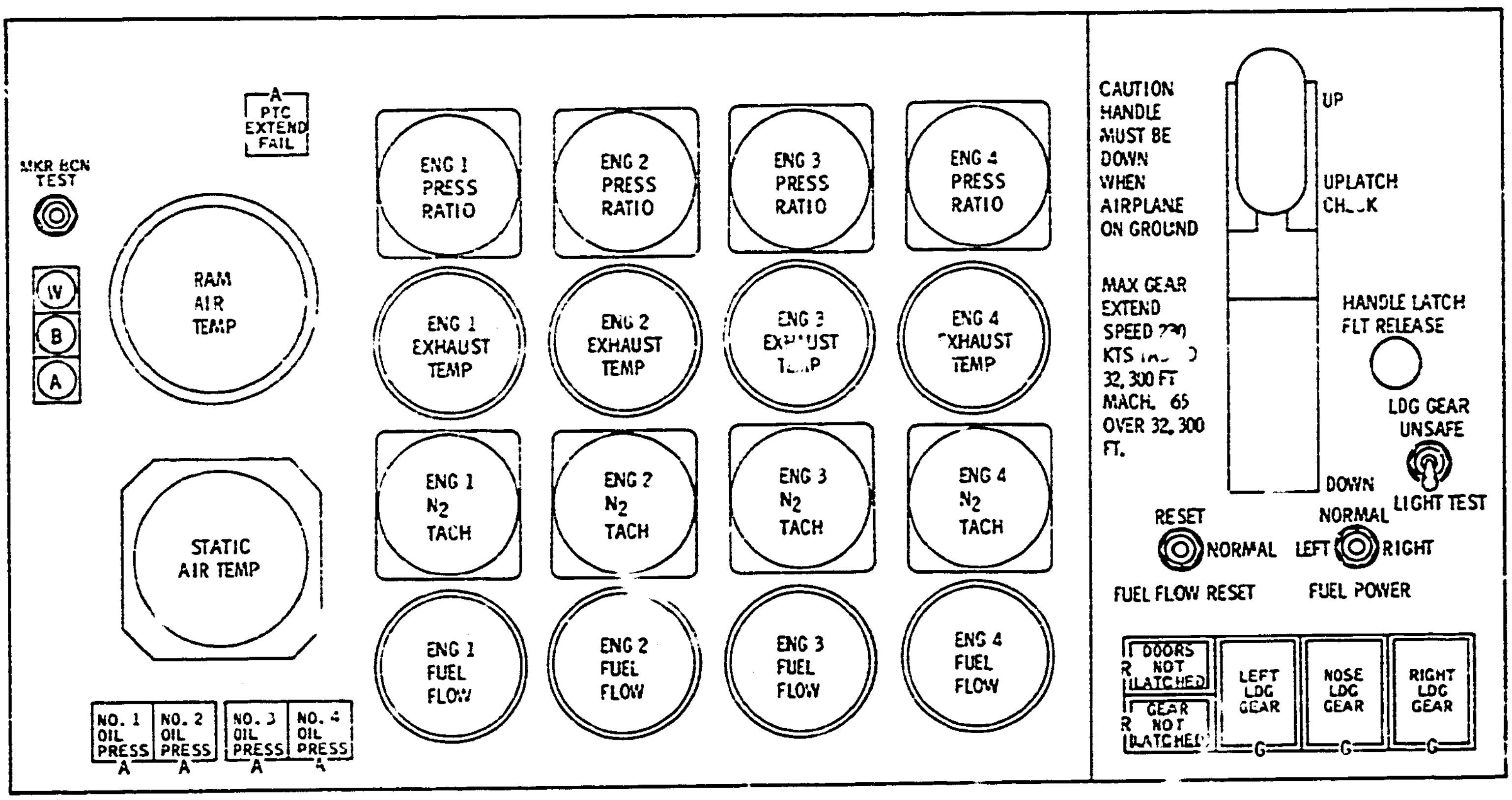
Engine Instrument Panel
Figure 1



W = WHITE INDICATING LIGHT
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
G = GREEN INDICATING LIGHT

1A2-3698

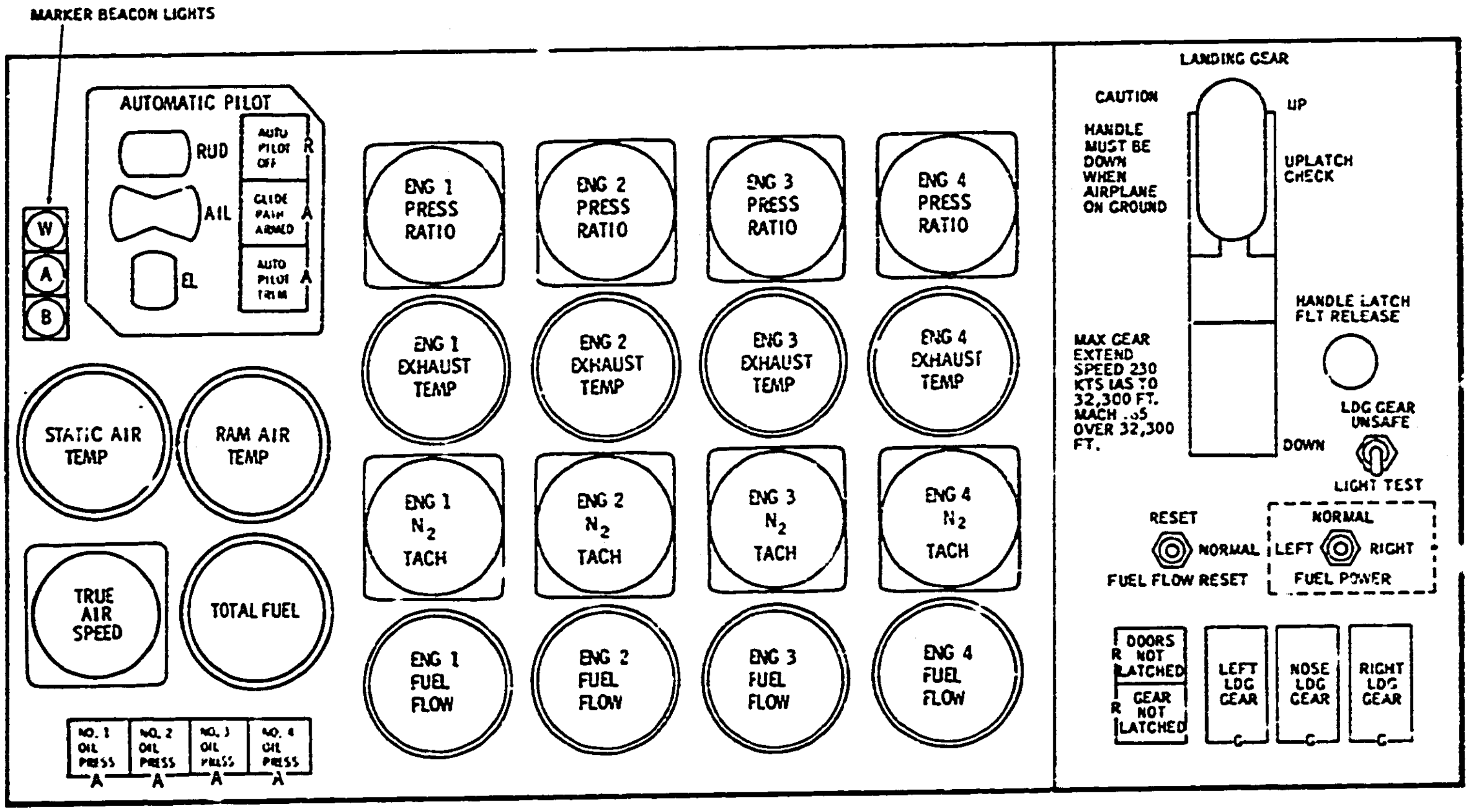
Engine Instrument Panel
Figure 1



W - WHITE INDICATING LIGHT
A - AMBER INDICATING LIGHT
B - BLUE INDICATING LIGHT
R - RED WARNING LIGHT
G = GREEN INDICATING LIGHT

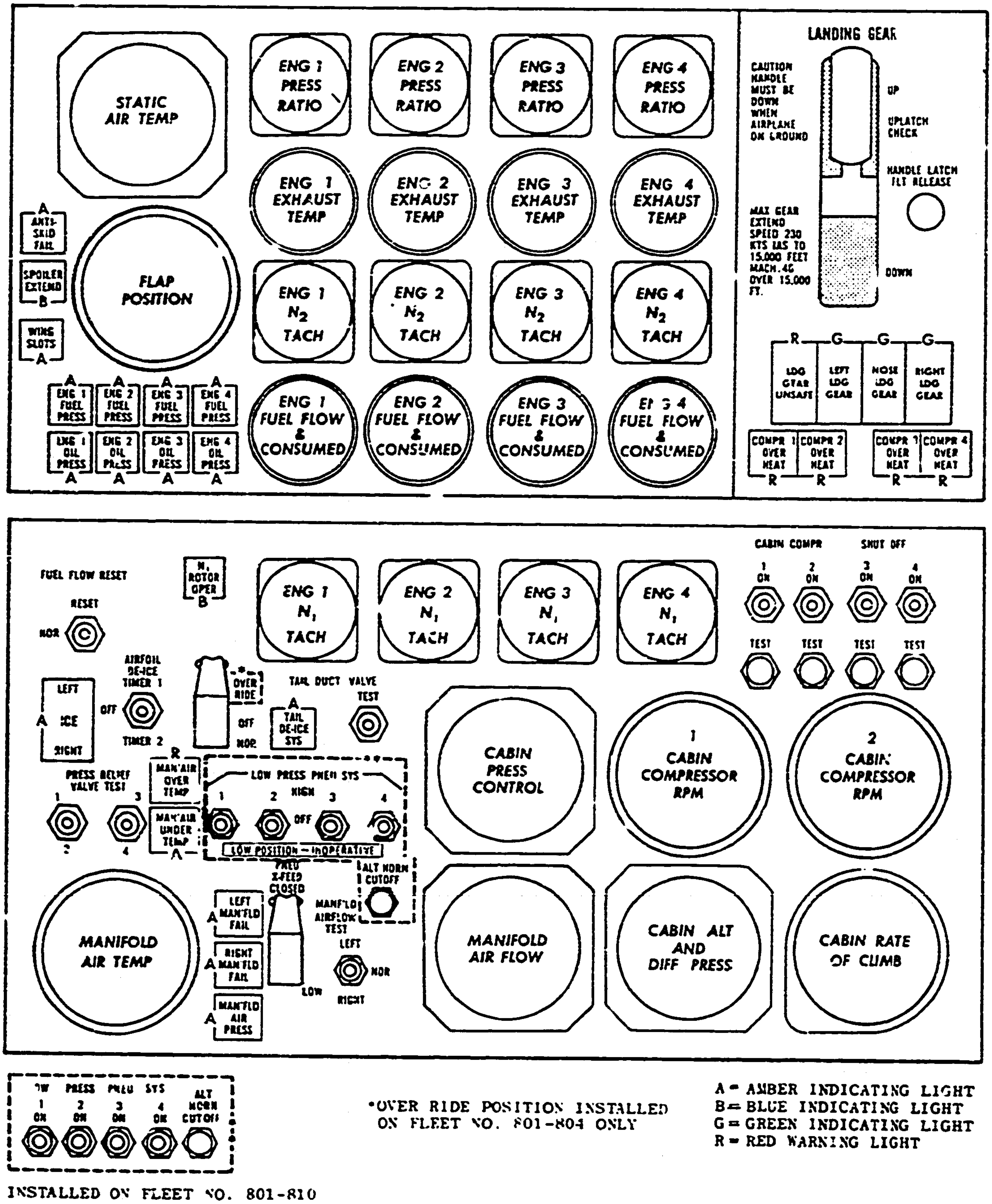
HA2-3750A

Engine Instrument Panel
Figure 1



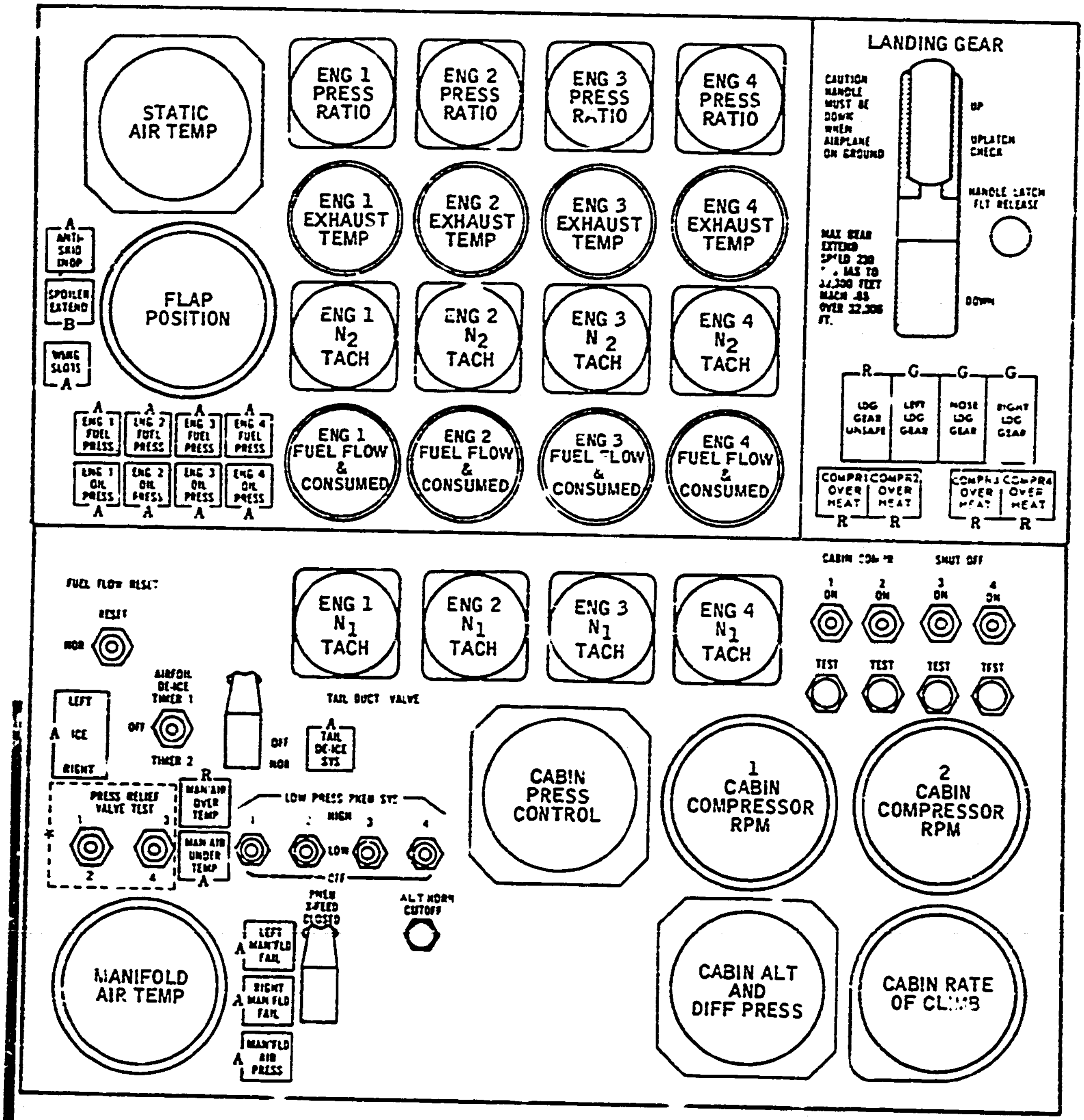
W = WHITE INDICATING LIGHT
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
G = GREEN INDICATING LIGHT
* INSTALLED ON JA8031 - JA8037, JA8040, JA8044

Engine Instrument Panel
Figure 1



H1-180B

Engine Instrument Panel
Figure 1

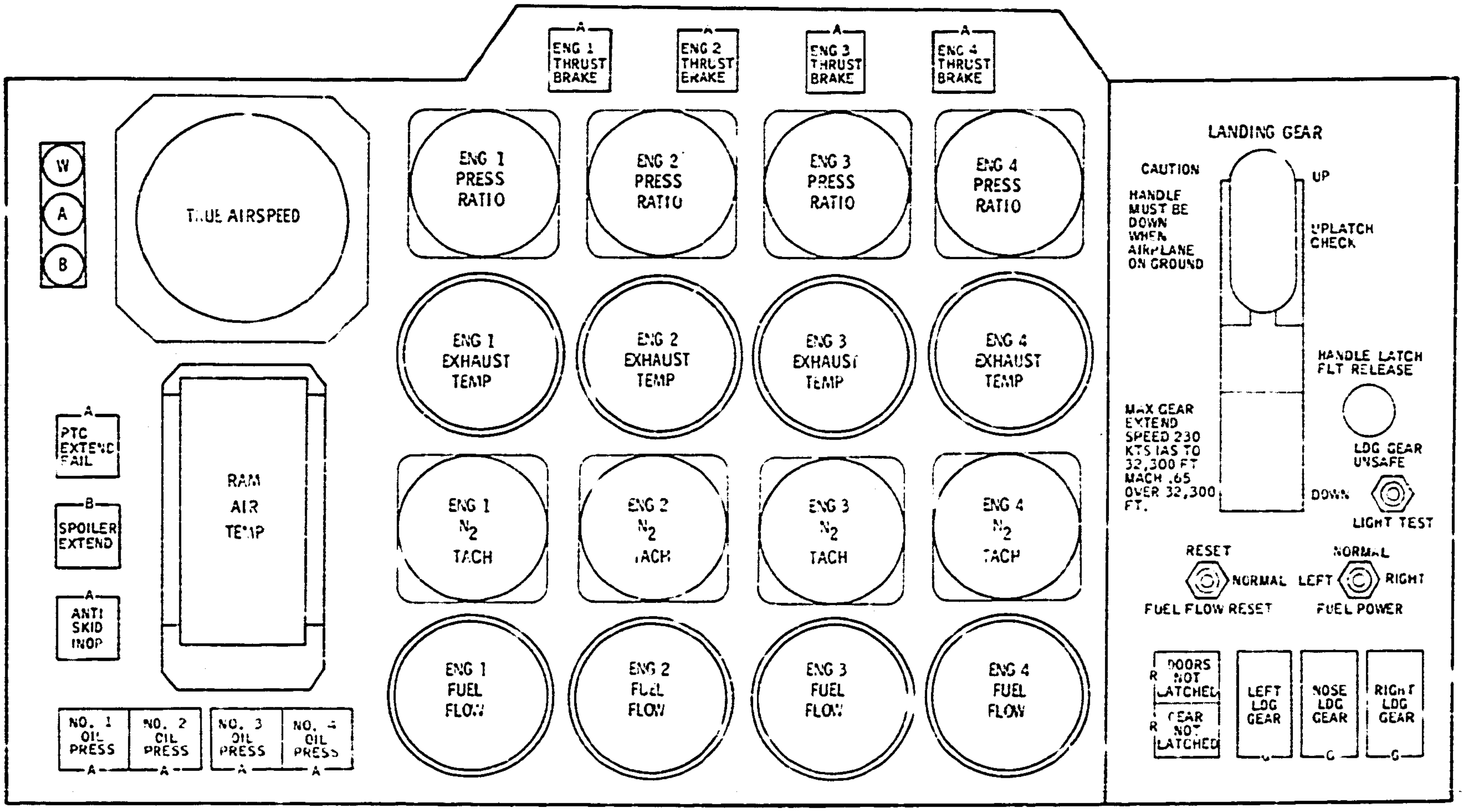


A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT
R = RED WARNING LIGHT
* = INSTALLED ON 812-819 ONLY

H1-1103D

Engine Instrument Panel
Figure 1

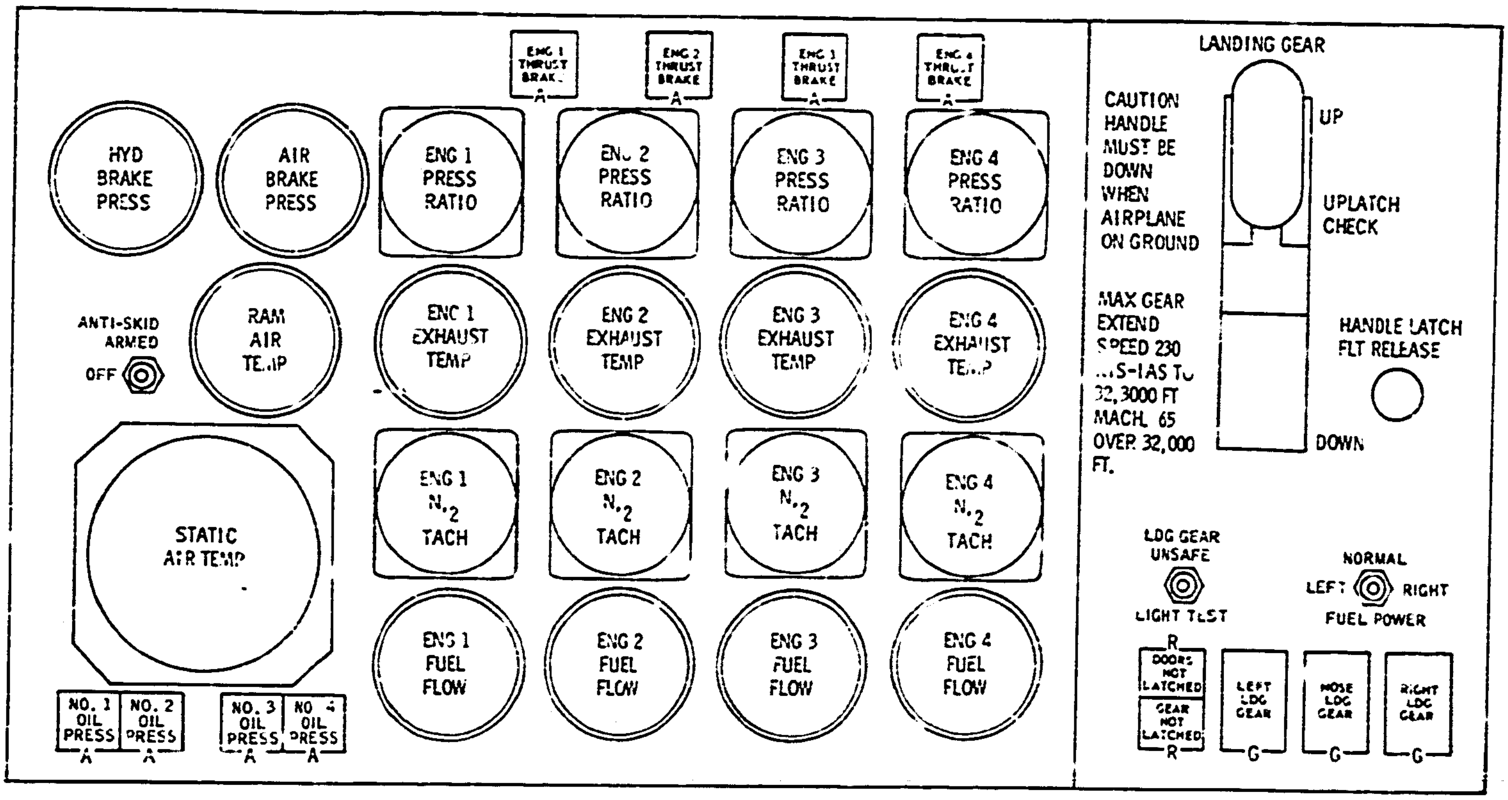
Printed in U.S.A



A AMBER INDICATING LIGHT
R PED WARNING LIGHT
G GREEN INDICATING LIGHT
W = WHITE INDICATING LIGHT
B = BLUE INDICATING LIGHT

HA2-4806

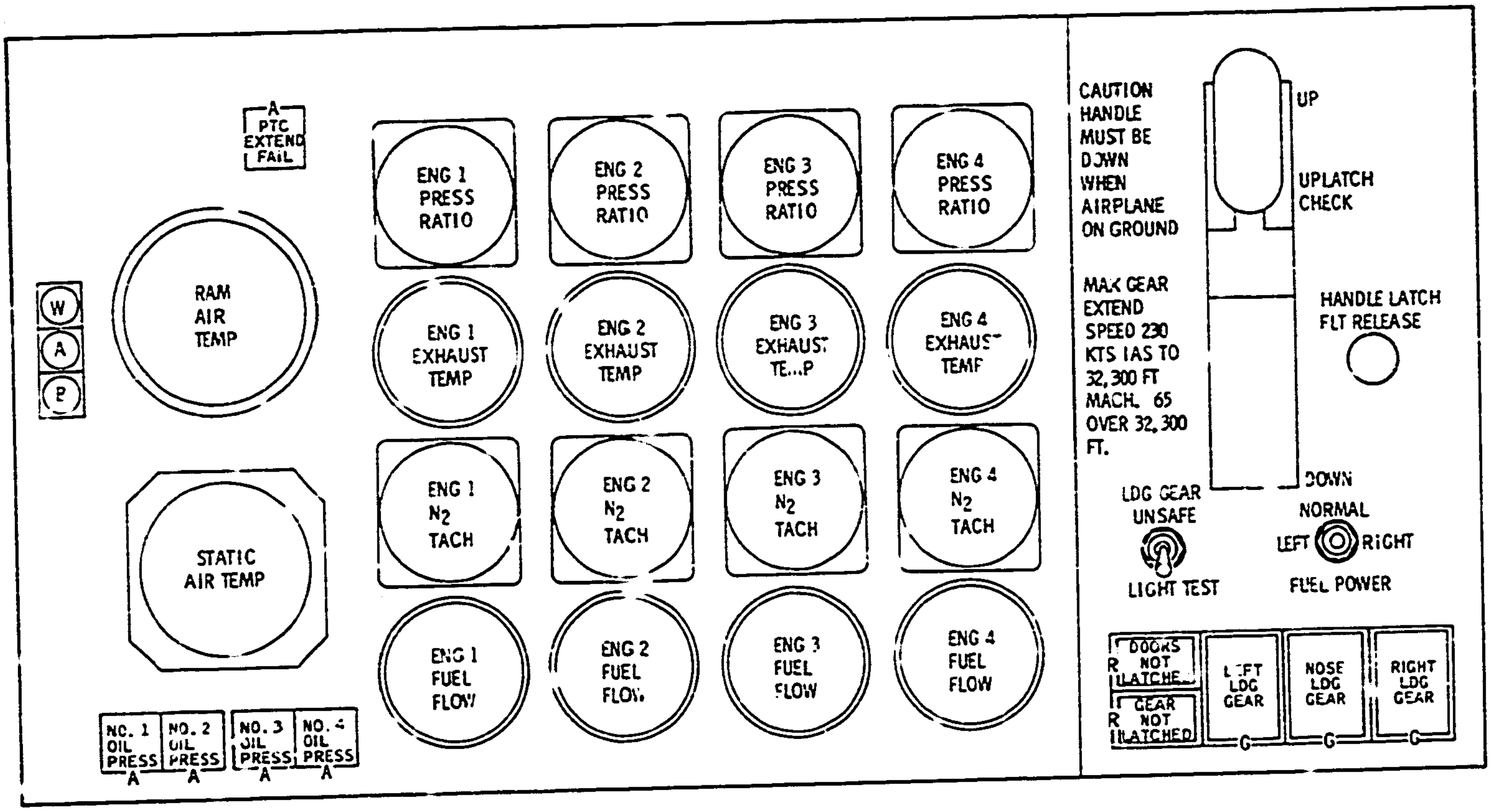
Engine Instrument Panel
Figure 1



A = AMBER INDICATING LIGHT
R - RED WARNING LIGHT
G = GREEN INDICATING LIGHT

HA2-4326

Engine Instrument Panel
Figure 1

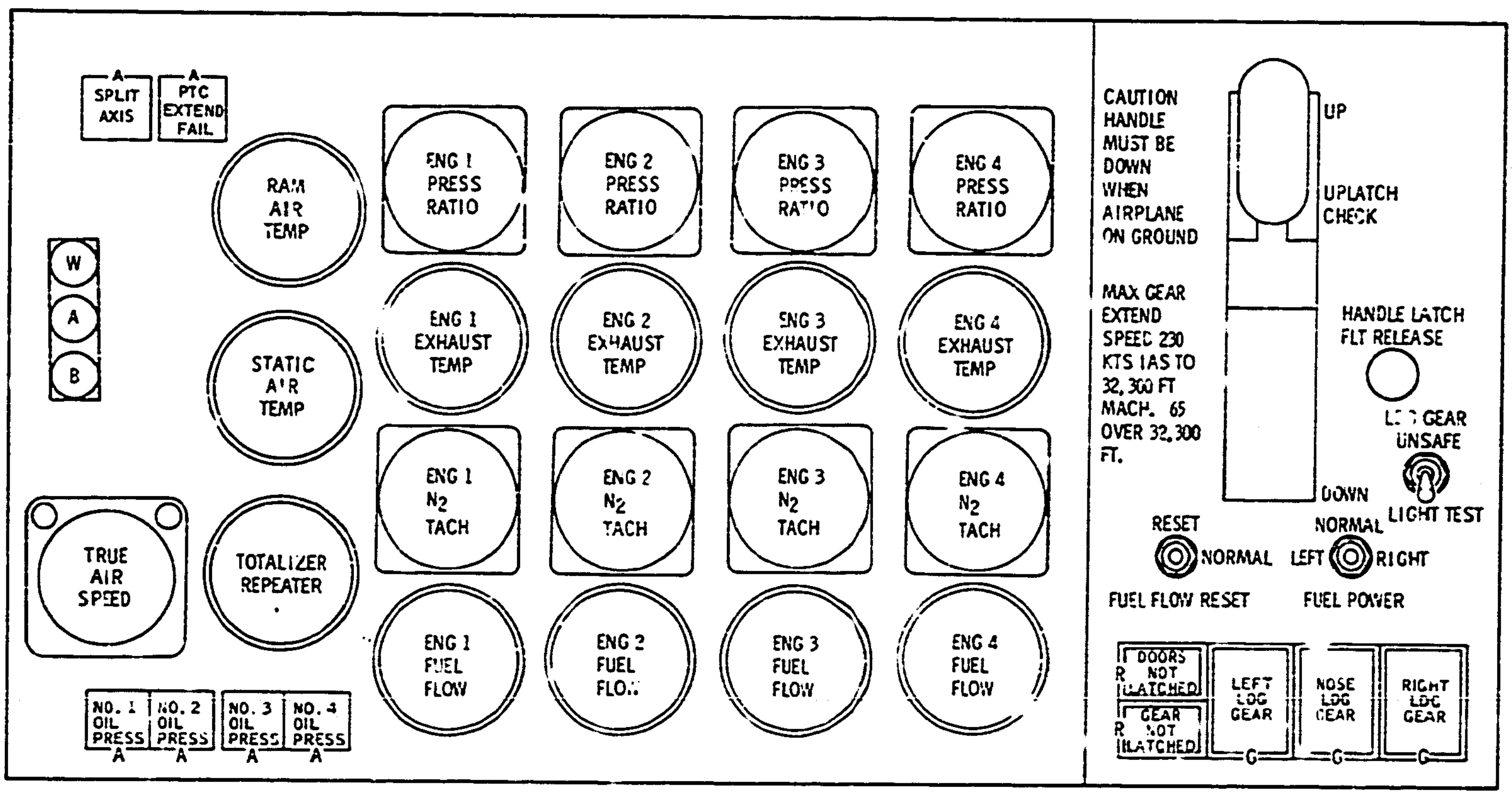


W = WHITE INDICATING LIGHT
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
G = GREEN INDICATING LIGHT

HA2-4827

Engine Instrument Panel
Figure 1

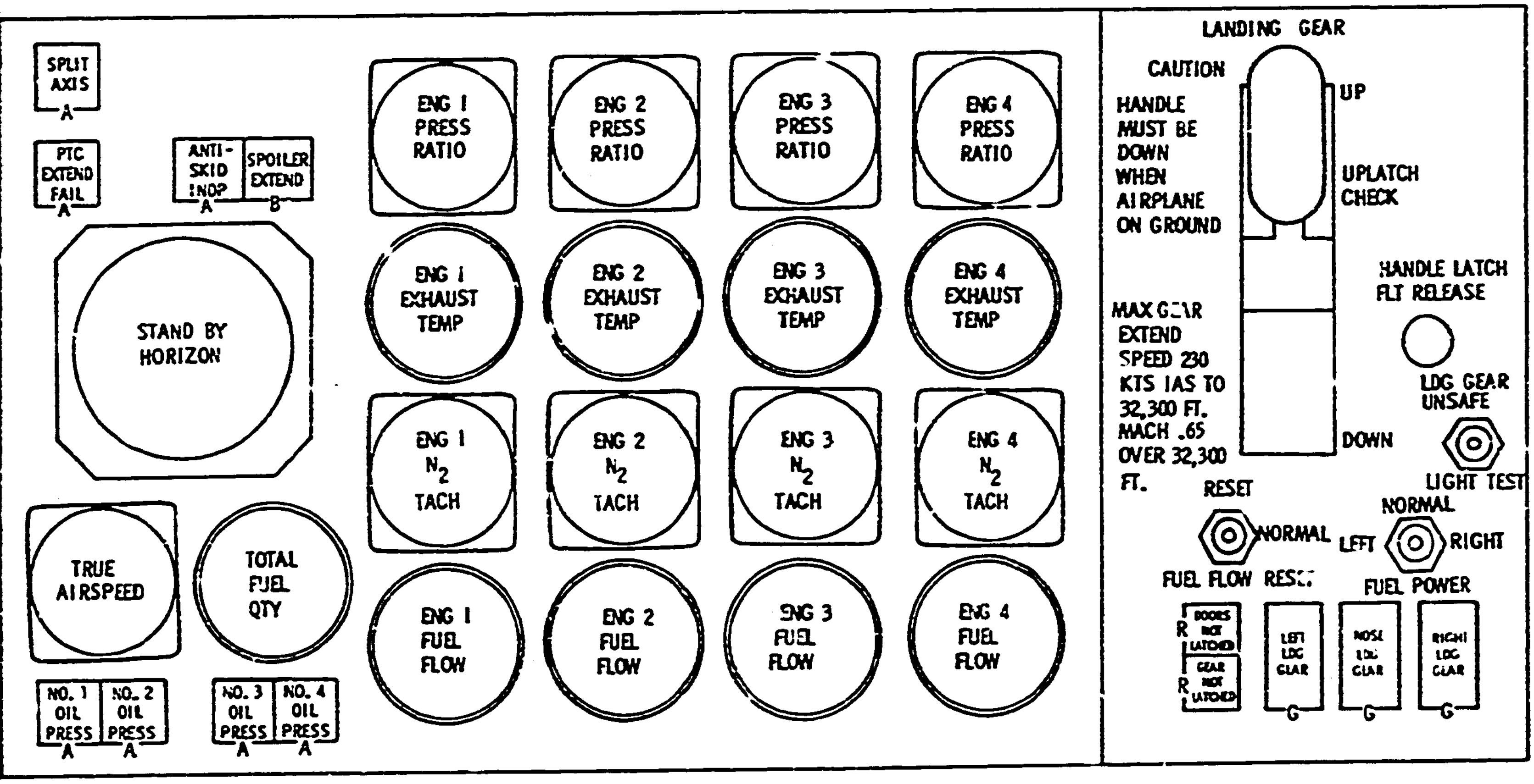
Printed in U.S.A.



W = WHITE INDICATING LIGHT
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
G = GREEN INDICATING LIGHT

HA2-4825

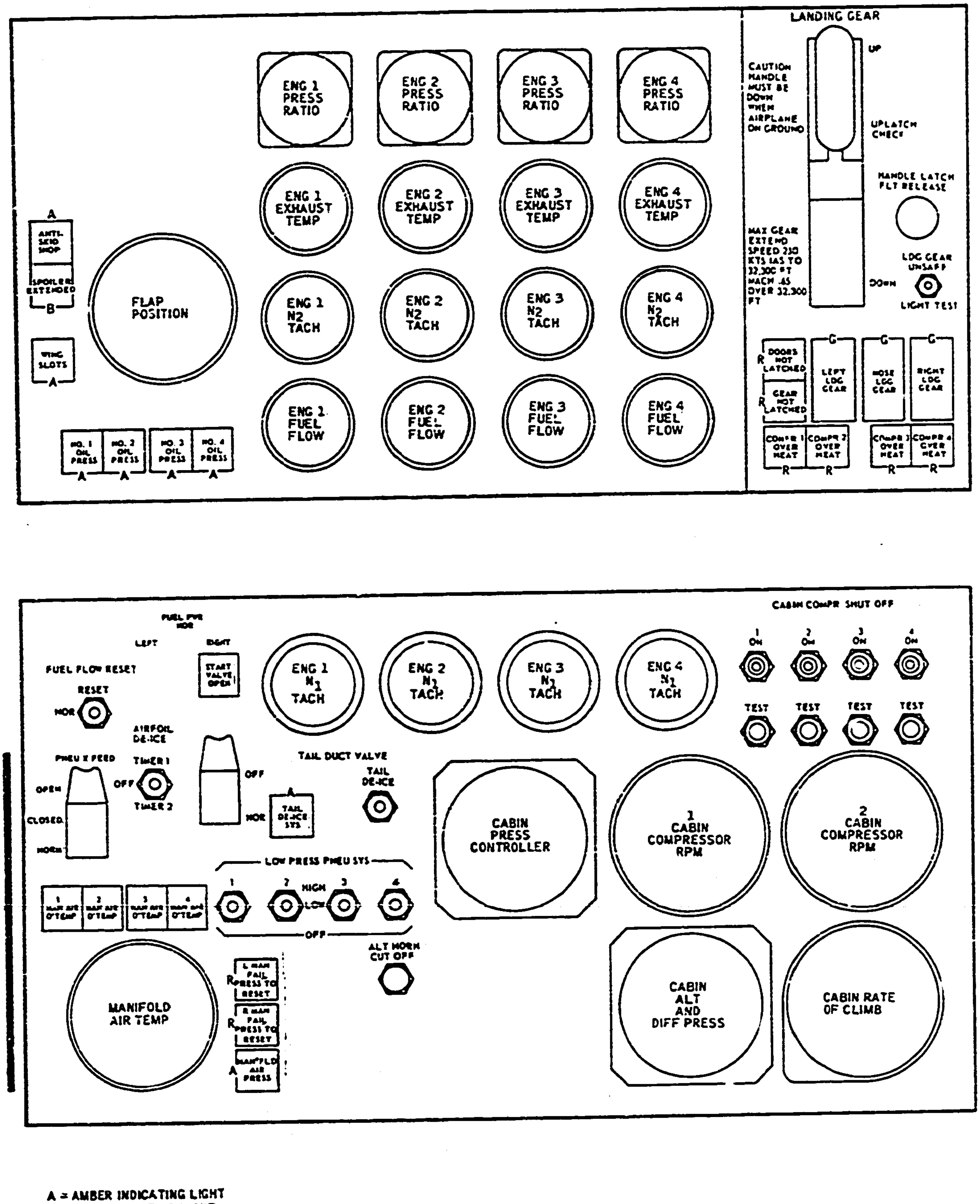
Engine Instrument Panel
Figure 1



A = AMBER INDICATING LIGHT
G = GREEN INDICATING LIGHT
R = RED WARNING LIGHT

HA2-4458

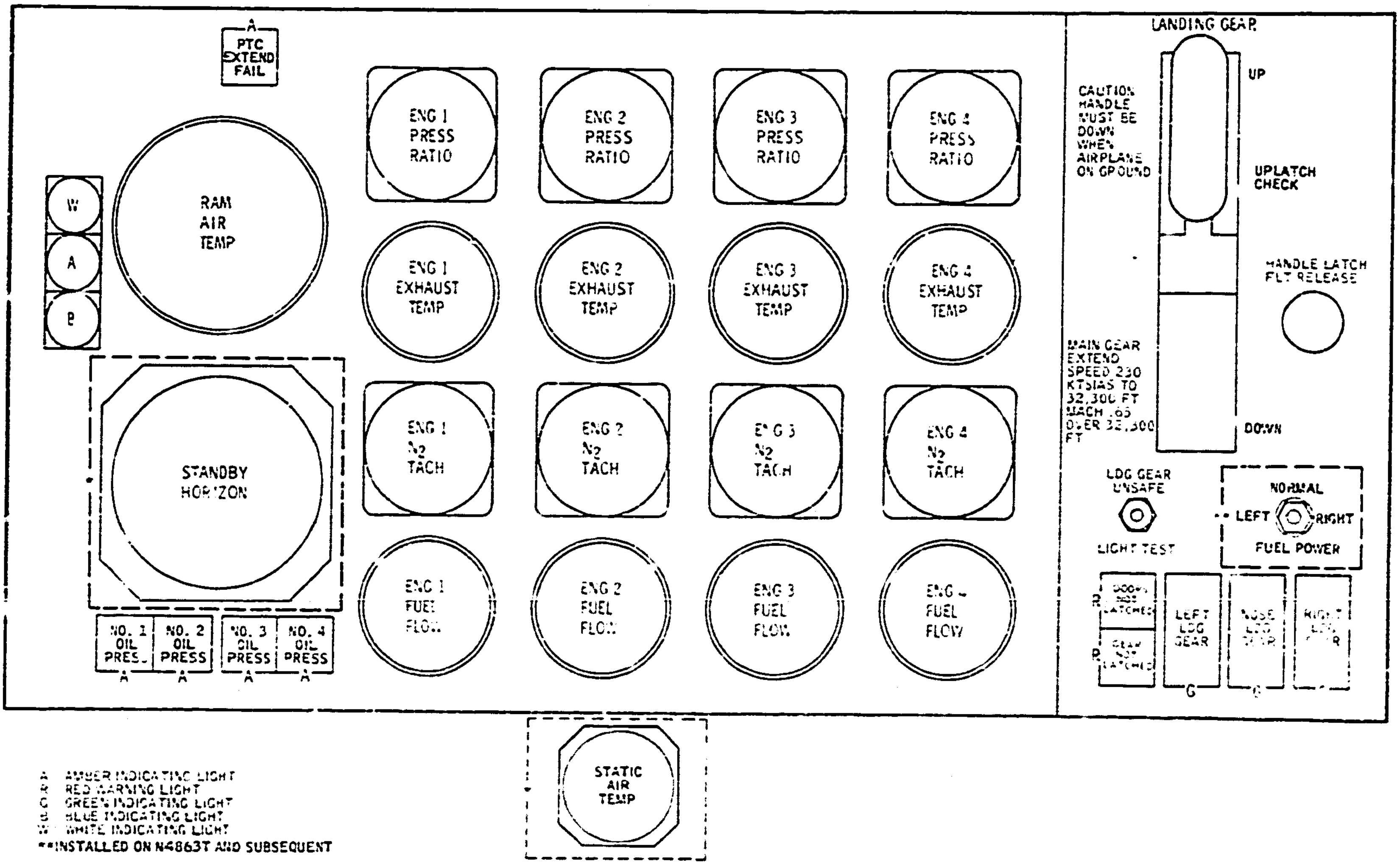
Engine Instrument Panel
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
G = GREEN INDICATING LIGHT
R = RED INDICATING LIGHT

HA2-5478A

Engine Instrument Panel
Figure 1

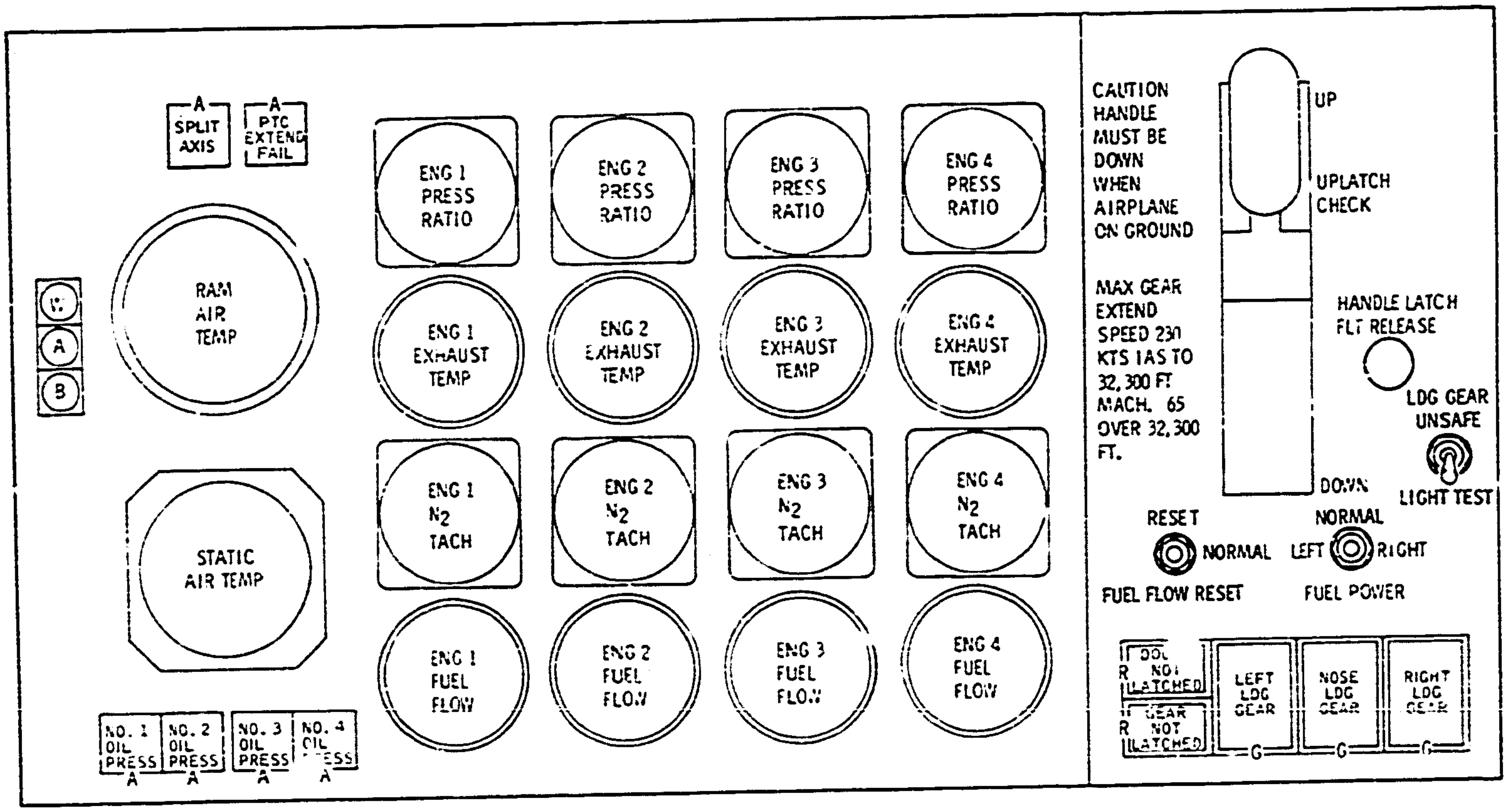


A - AMBER INDICATING LIGHT
R - RED WARNING LIGHT
G - GREEN INDICATING LIGHT
B - BLUE INDICATING LIGHT
W - WHITE INDICATING LIGHT
**INSTALLED ON N4863T AND SUBSEQUENT

INSTALLED ON N4863T AND SUBSEQUENT

VA2-5772A

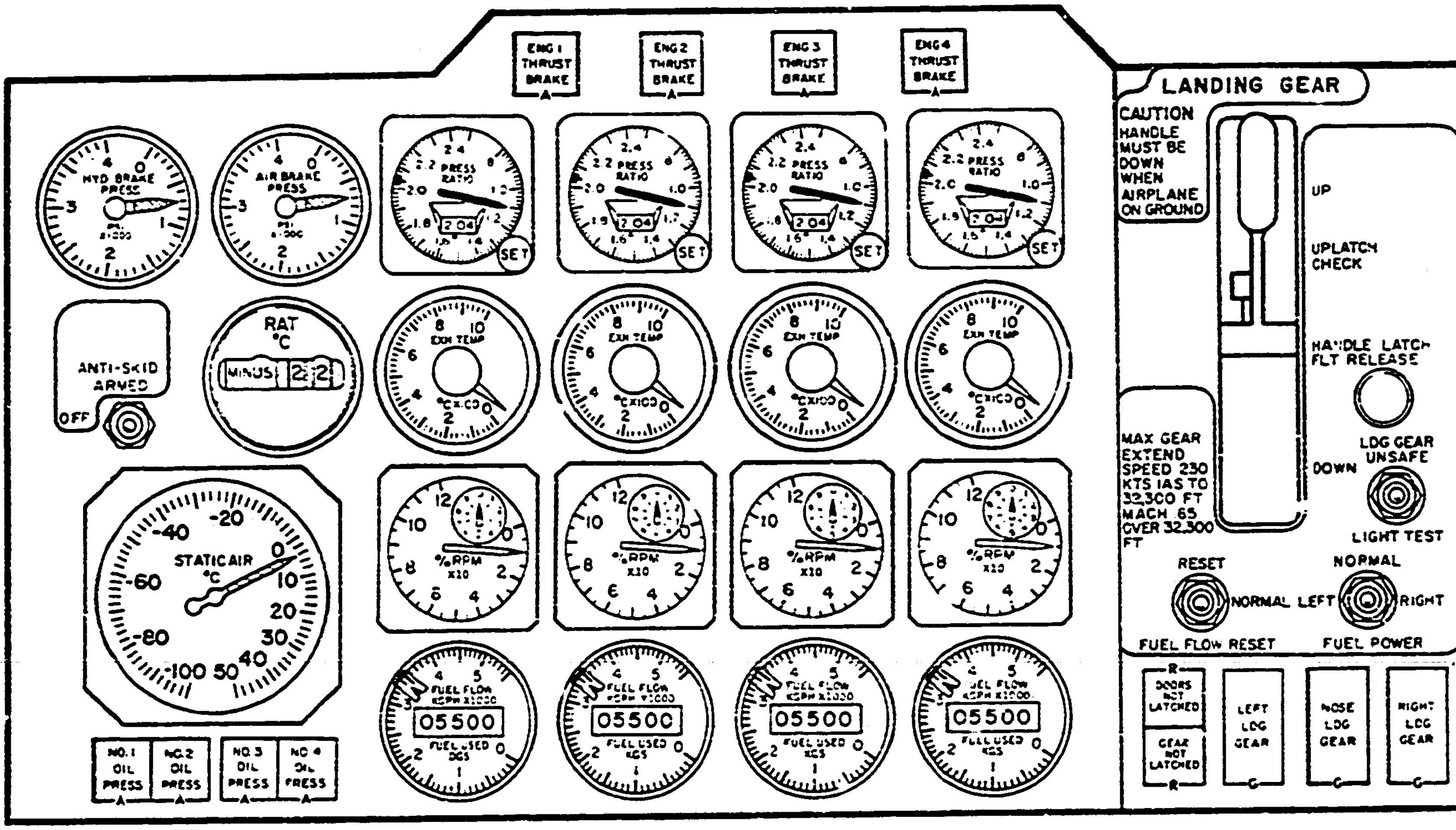
Engine Instrument Panel
Figure 1



W WHITE INDICATING LIGHT
A AMBER INDICATING LIGHT
B BLUE INDICATING LIGHT
R RED WARNING LIGHT
G GREEN INDICATING LIGHT

HA2-659

Engine Instrument Panel
Figure 1



A = AMBER INDICATING LIGHT
R = RED WARNING LIGHT
G = GREEN INDICATING LIGHT

HA 5887

Engine Instrument Panel
Figure 1

Printed in U.S.A.

ENGINE INSTRUMENT PANEL - MAINTENANCE PRACTICES

1. General

A. In order to remove the engine instrument panel it is necessary to remove all power from the airplane and to disconnect all electrical connectors from the instruments. Pressure from the rack-and-panel mounted instruments should be relieved before removal of the panel.

B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Engine Instrument Panel

A. Remove Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

NOTE: Pressure ratio, tachometer, and fuel flow indicators are rack-and-panel mounted.

(2) Restrain each rack-and-panel mounted instrument by hand pressure around edge of bezel, loosen mounting clamp adjustment screw, and allow instrument to eject slowly part way out of cavity.

(3) Pull instrument clear of connector (about halfway out of cutout) and tighten mounting clamp adjustment screw.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING REMOVAL OPERATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

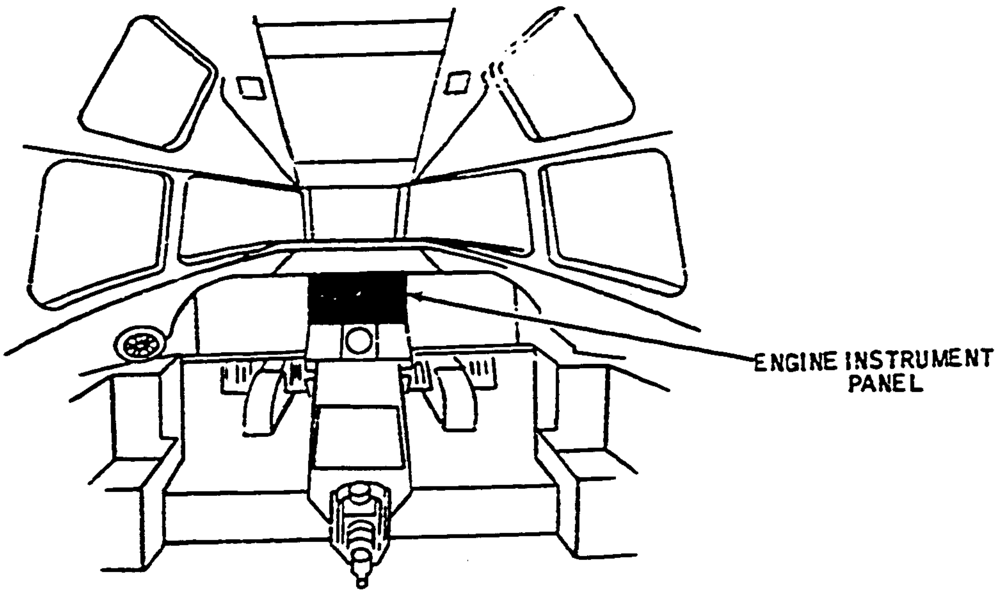
(4) Inspect instrument for properly secured mounting.

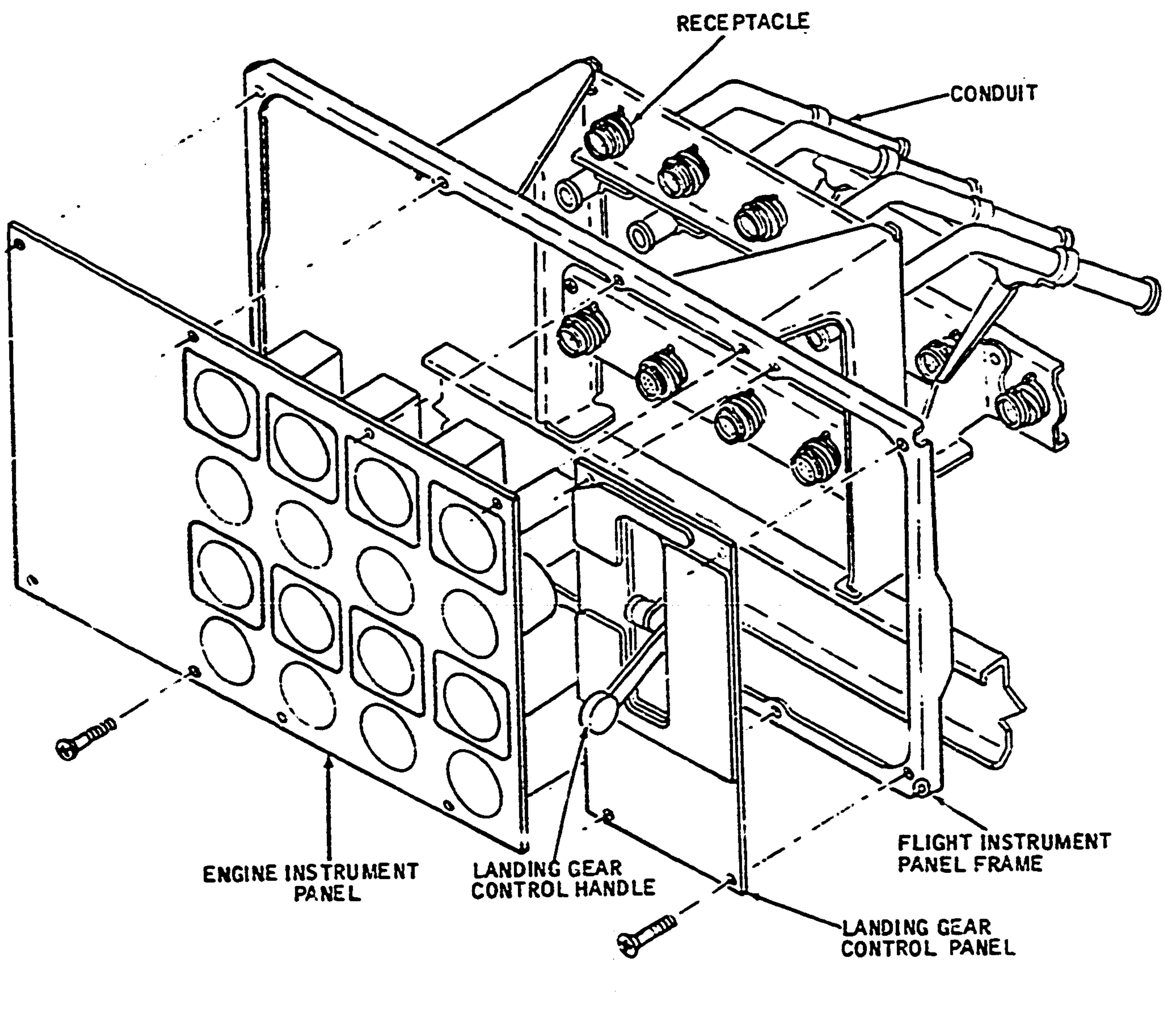
(5) Lossen quick-release fasteners around perimeter of panel.

CAUTION: BE CAREFUL WHEN REMOVING ENGINE INSTRUMENT PANEL TO AVOID DAMAGE TO INSTRUMENTS OR PILOTS' PEDESTAL.

(6) Lift panel out a few inches and disconnect, tag, and cap electrical connectors.

(7) Remove panel.





Engine Instrument Panel Replacement
Figure 201

B. Install Panel

(1) Verify power is removed from airplane.

(2) Check that all indicators are securely clamped in panel extended about half way out.

CAUTION: BE CAREFUL WHEN INSTALLING ENGINE INSTRUMENT PANEL TO AVOID DAMAGE TO INSTRUMENTS OR PILOTS' PEDESTAL.

(3) Carefully position panel a few inches in front of cavity.

(4) Remove all caps and connect electrical connections.

(5) Place panel into cavity and secure with quick-release fasteners.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING INSTALLATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(6) Loosen mounting clamp adjustment screws, and slide instruments into cavities.

NOTE: Rack-and-panel mounted instruments must have electrical connectors aligned with receptacles and be pressed firmly into position before tightening mounting clamps.

(7) Tighten mounting clamps.

(8) Perform operational test of all systems involved to determine integrity of new installation.

3. Removal/Installation Landing Gear Panel

A. Remove Panel

(1) Remove power from airplane.

(2) Remove four attaching screws around perimeter of panel.

(3) Pull panel out a few inches and disconnect and tag electrical wires.

(4) Slide panel over landing gear levers.

(5) Remove panel.

B. Install Panel

(1) Verify power is removed from airplane.

(2) Slide panel over landing gear levers.

(3) Place panel a few inches from cavity and connect electrical wires.

(4) Position panel into cavity and secure with four screws.

(5) Perform operational test of all systems involved to determine integrity of new installation.

ENGINE INSTRUMENT PANEL - MAINTENANCE PRACTICES

1. General

A. In order to remove the engine instrument panel it is necessary to remove all power from the airplane and to disconnect all electrical connectors from the instruments. Pressure from the rack-and-panel mounted instruments should be relieved before removal of the panel.

B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Engine Instrument Panel

A. Remove Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

NOTE: Pressure ratio and tachometer indicators are rack-and-panel mounted.

(2) Restrain each rack-and-panel mounted instrument by hand pressure around edge of bezel, loosen mounting clamp adjustment screw, and allow instrument to eject slowly part way out of cavity.

(3) Pull instrument clear of connector (about halfway out of cutout) and tighten mounting clamp adjustment screw.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING REMOVAL OPERATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

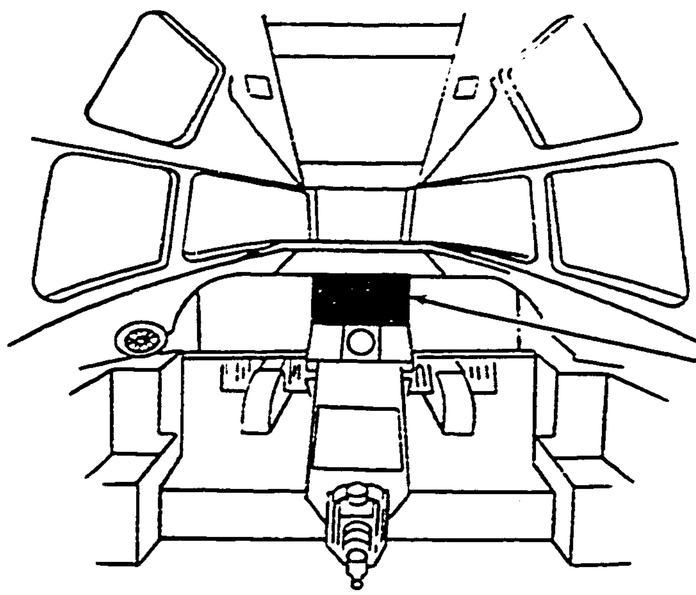
(4) Inspect instrument for properly secured mounting.

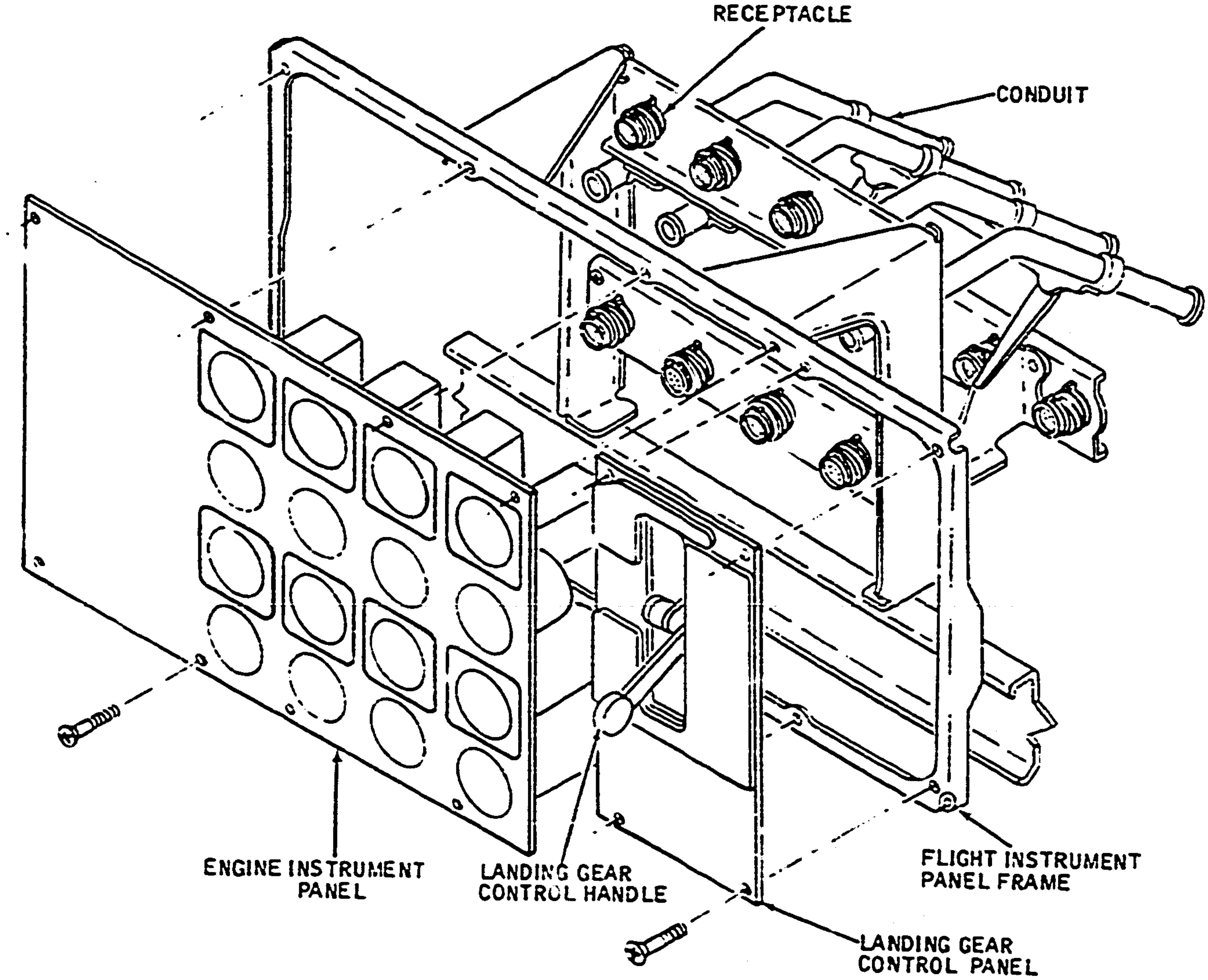
(5) Loosen quick-release fasteners around perimeter of panel.

CAUTION: BE CAREFUL WHEN REMOVING ENGINE INSTRUMENT PANEL TO AVOID DAMAGE TO INSTRUMENTS OR PILOTS' PEDESTAL.

(6) Lift panel out a few inches and disconnect, tag, and cap electrical connectors.

(7) Remove panel.





HA2-1296

Engine Instrument Panel Replacement
Figure 201

B. Install Panel

(1) Verify power is removed from airplane.

(2) Check that all indicators are securely clamped in panel extended about half way out.

CAUTION: BE CAREFUL WHEN INSTALLING ENGINE INSTRUMENT PANEL TO AVOID DAMAGE TO INSTRUMENTS OR PILOTS' PEDESTAL.

(3) Carefully position panel a few inches in front of cavity.

(4) Remove all caps and connect electrical connections.

(5) Place panel into cavity and secure with quick-release fasteners.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING INSTALLATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(6) Loosen mounting clamp adjustment screws, and slide instruments into cavities.

NOTE: Rack-and-panel mounted instruments must have electrical connectors aligned with receptacles and be pressed firmly into position before tightening mounting clamps.

(7) Tighten mounting clamps.

(8) Perform operational test of all systems involved to determine integrity of new installation.

3. Removal/Installation Landing Gear Panel

A. Remove Panel

(1) Remove power from airplane.

(2) Remove four attaching screws around perimeter of panel.

(3) Pull panel out a few inches and disconnect and tag electrical wires.

(4) Slide panel over landing gear levers.

(5) Remove panel.

B. Install Panel

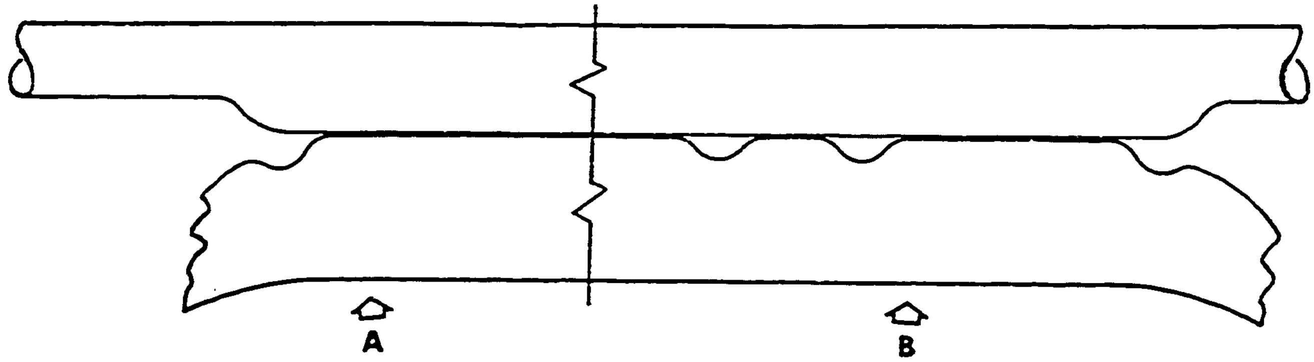
(1) Verify power is removed from airplane.

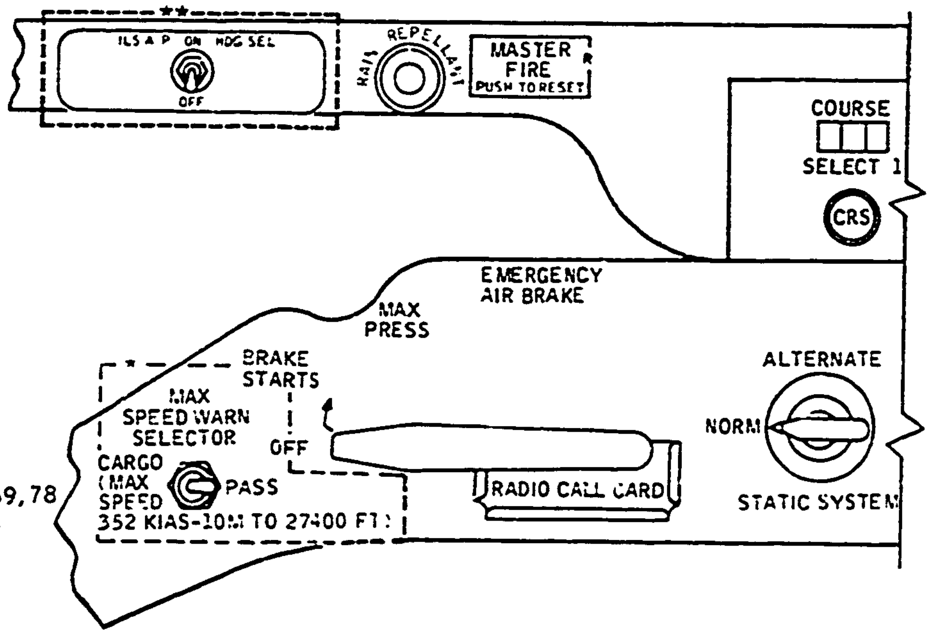
(2) Slide panel over landing gear levers.

(3) Place panel a few inches from cavity and connect electrical wires.

(4) Position panel into cavity and secure with four screws.

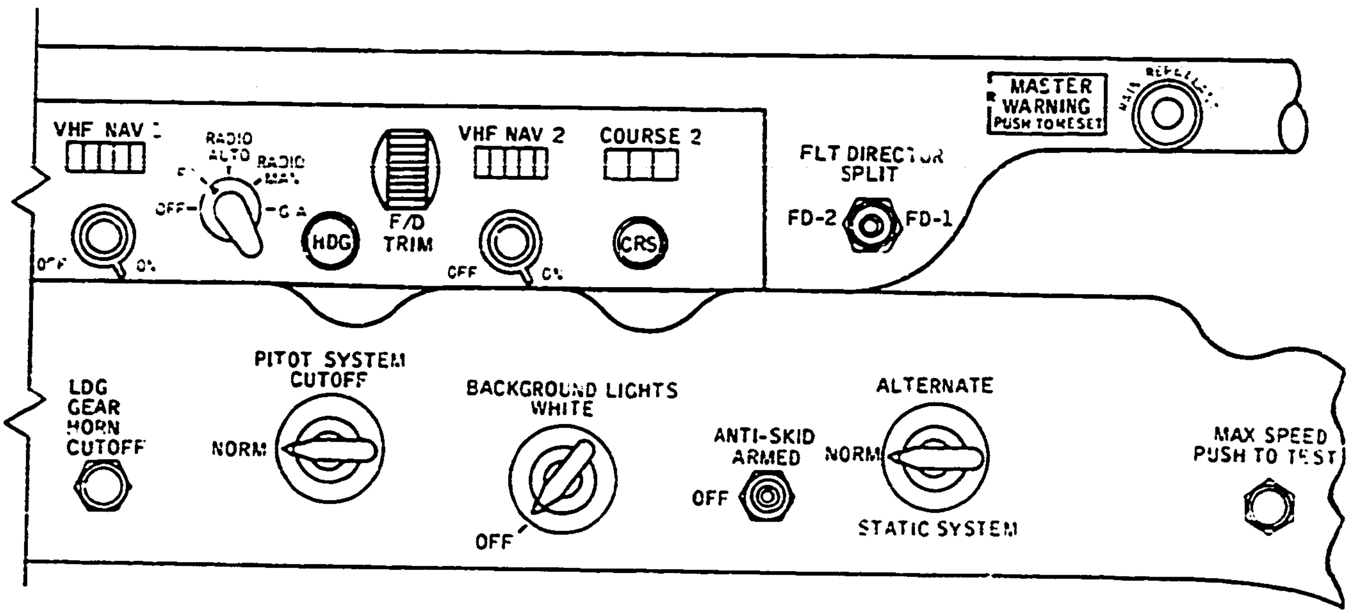
(5) Perform operational test of all systems involved to determine integrity of new installation.





R = RED WARNING LIGHT
* INSTALLED 63, 64, 66, 69, 78
** INSTALLED ON 69, 77, 78

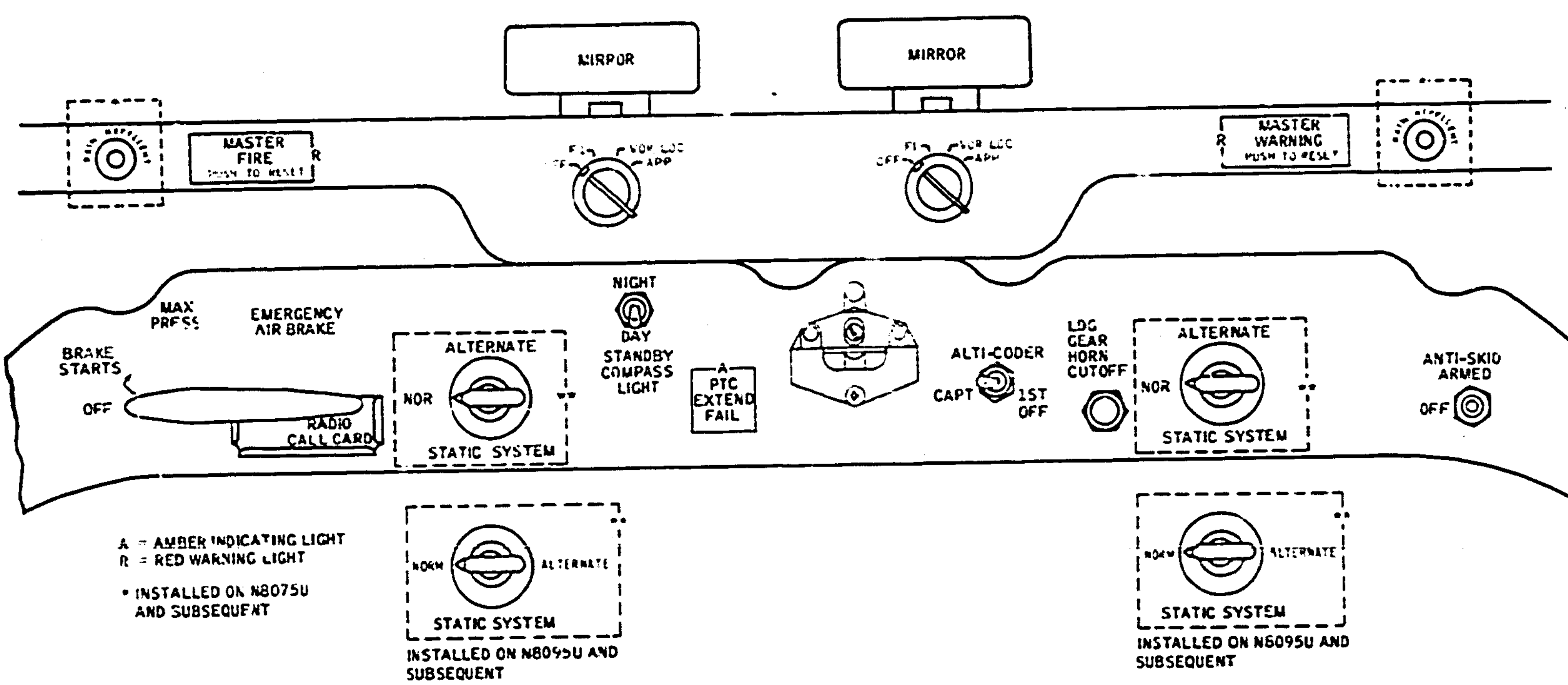
VIEW A



VIEW B

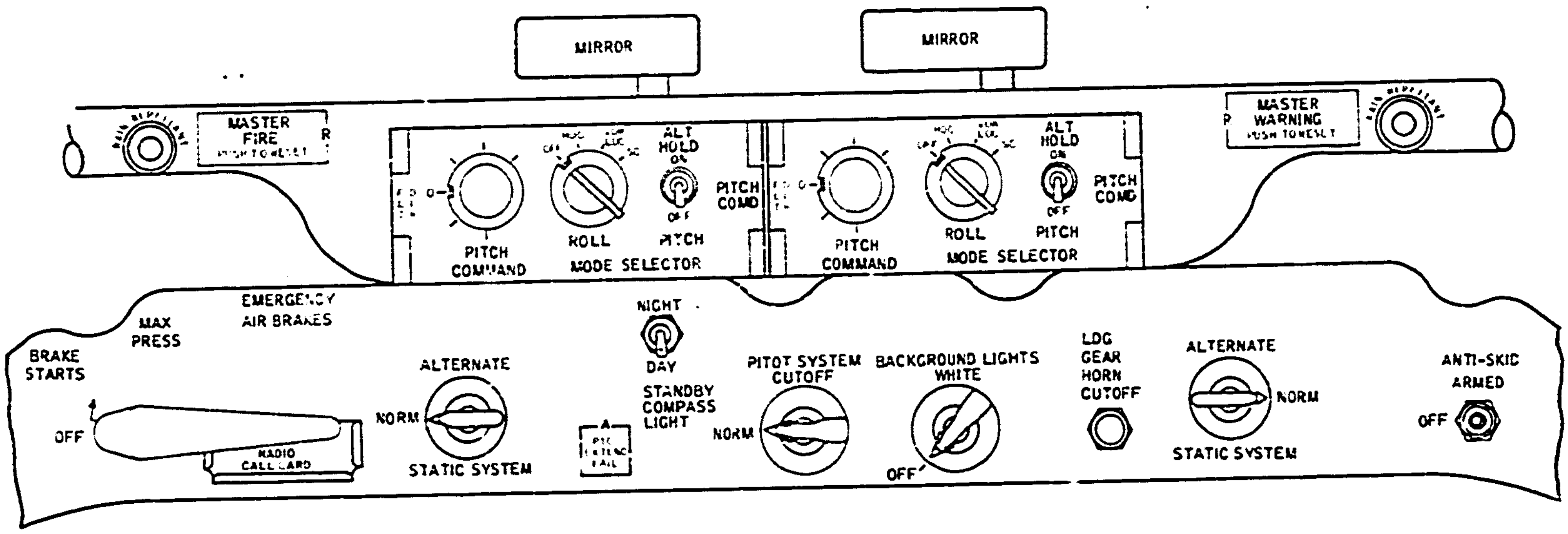
HA2-1211F

Glareshield Instrument Panel
Figure 1



HA2-1253F

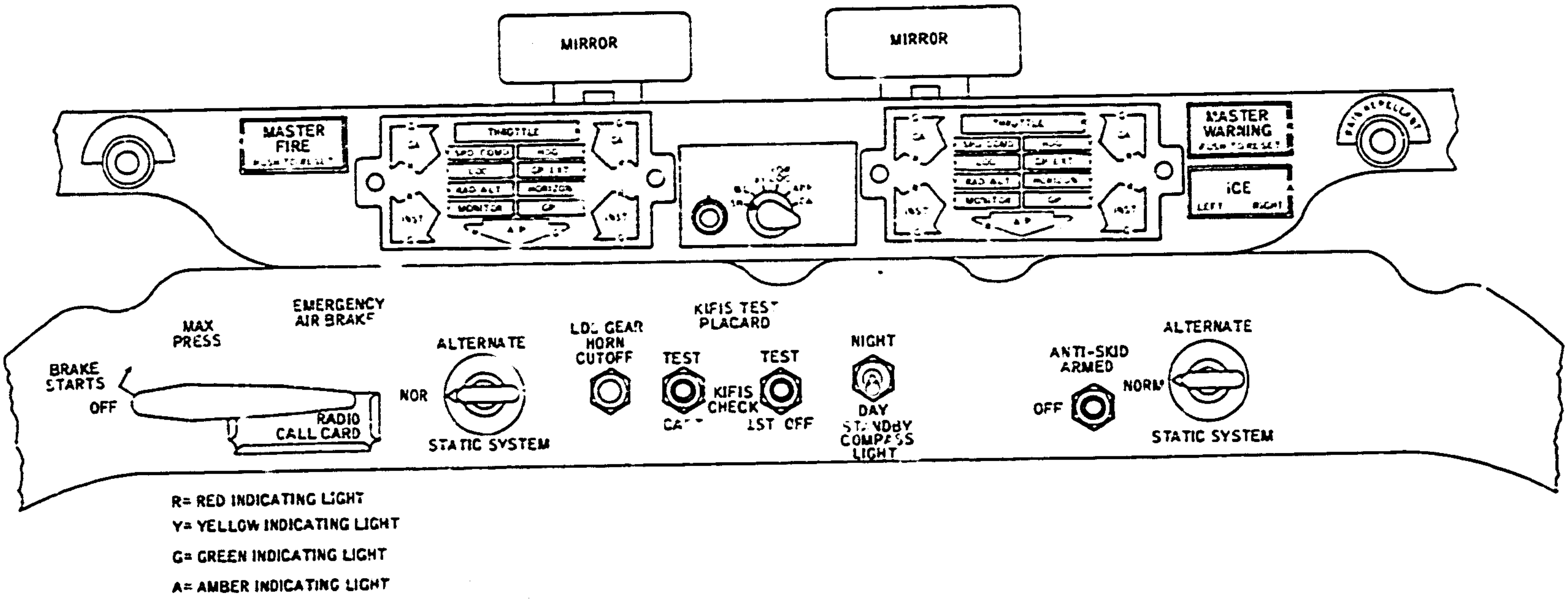
Glareshield Instrument Panel
Figure 1



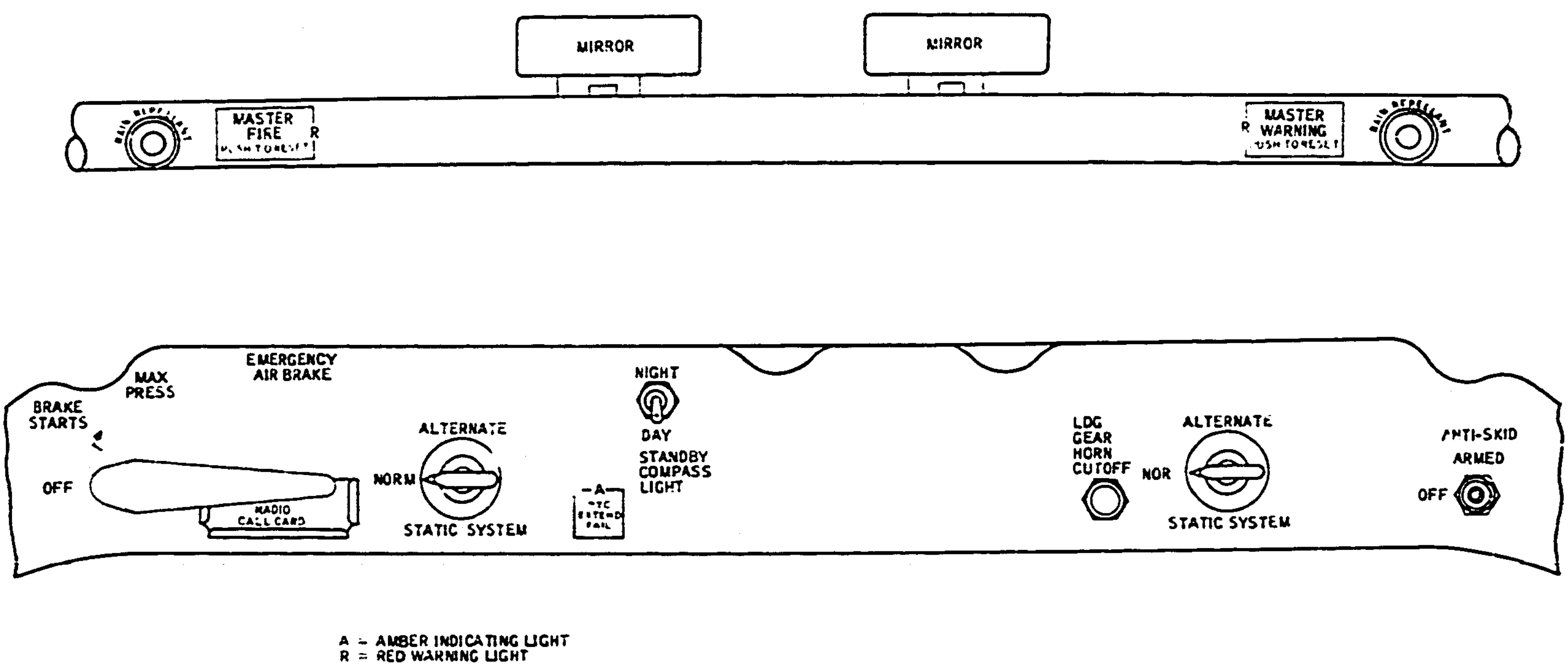
A = AMBER INDICATING LIGHT
R = RED WARNING LIGHT

HA2-1327B

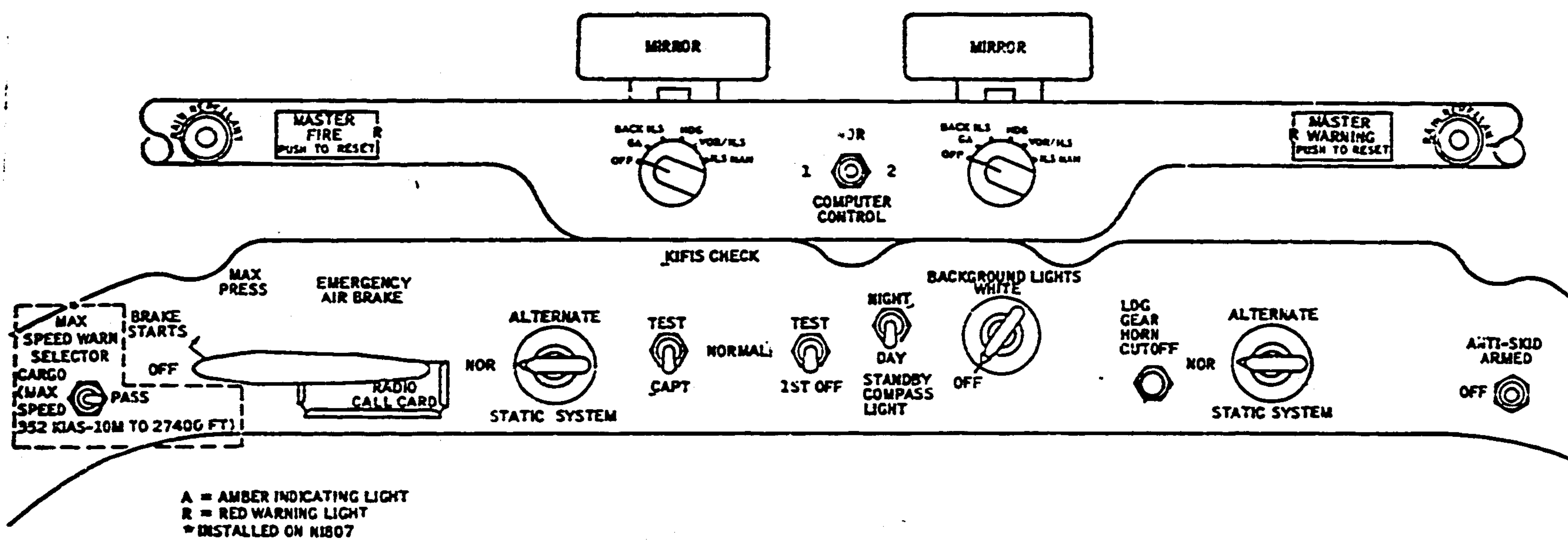
Glareshield Instrument Panel
Figure 1



Glareshield Instrument Panel
Figure 1



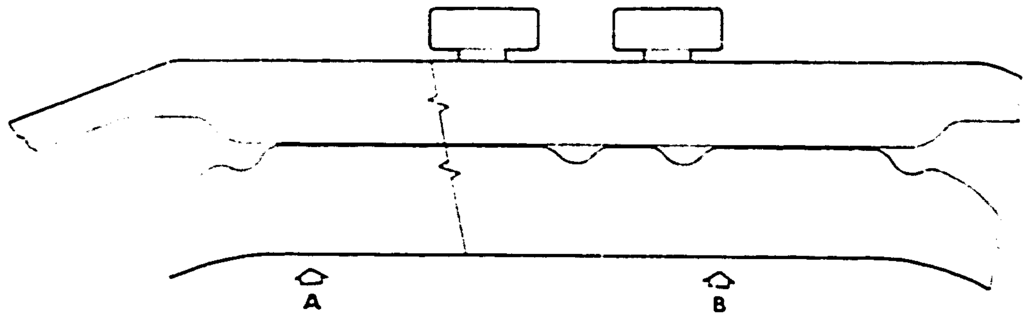
Glareshield Instrument Panel
Figure 1

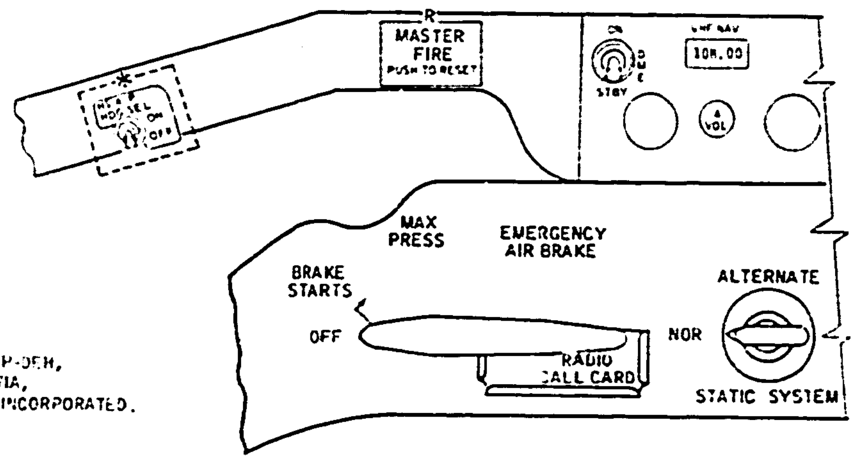


A = AMBER INDICATING LIGHT
R = RED WARNING LIGHT
* INSTALLED ON N1807

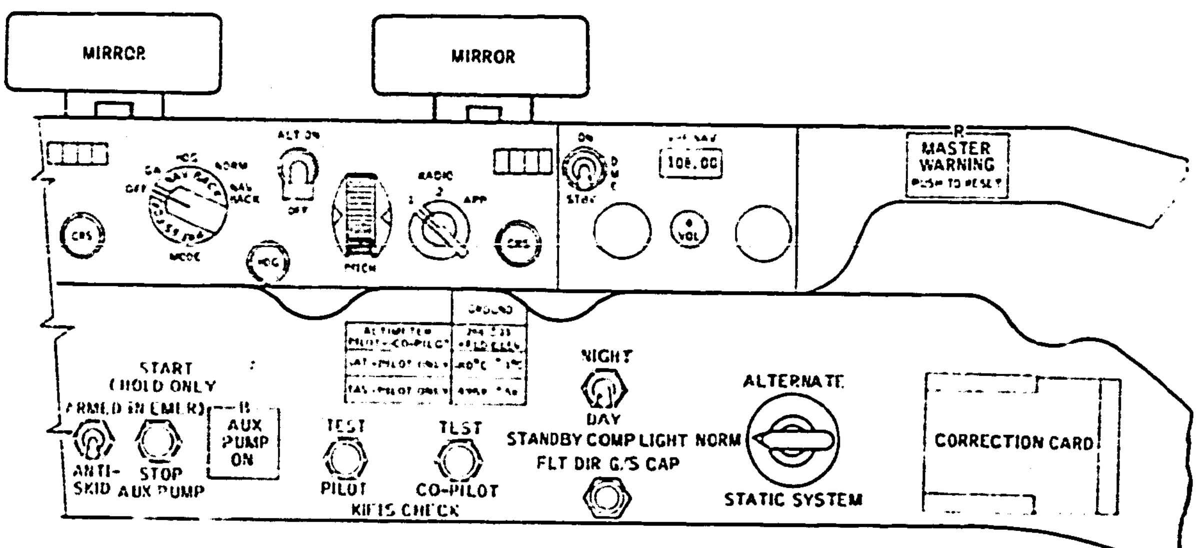
MA2-2964C

Glareshield Instrument Panel
Figure 1



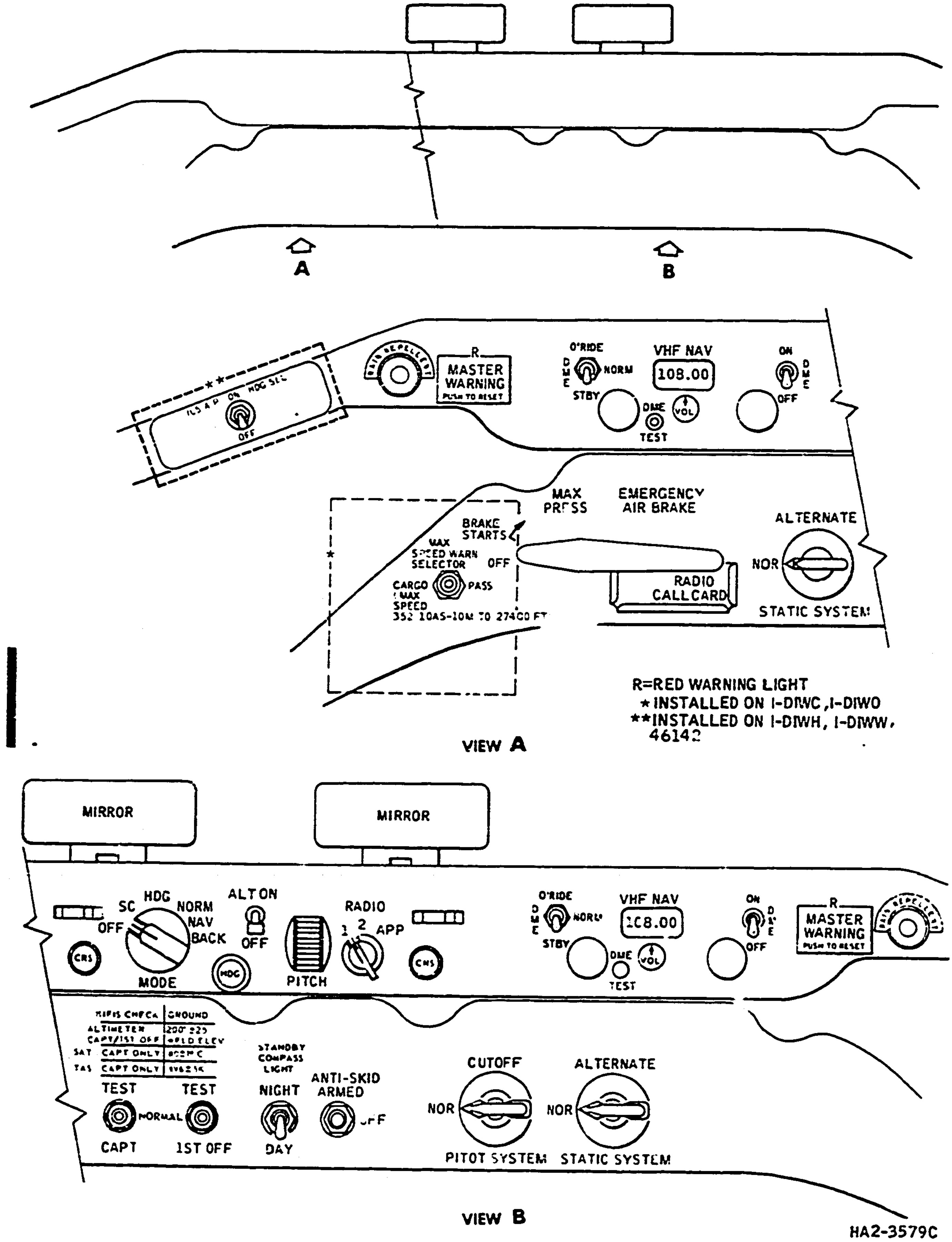


B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
* INSTALLED ON PH-DEA-PH-DEH,
PH-DEK-PH-DEM, YV-C-VIA,
YV-C-VIB WITH SB22-41 INCORPORATED.

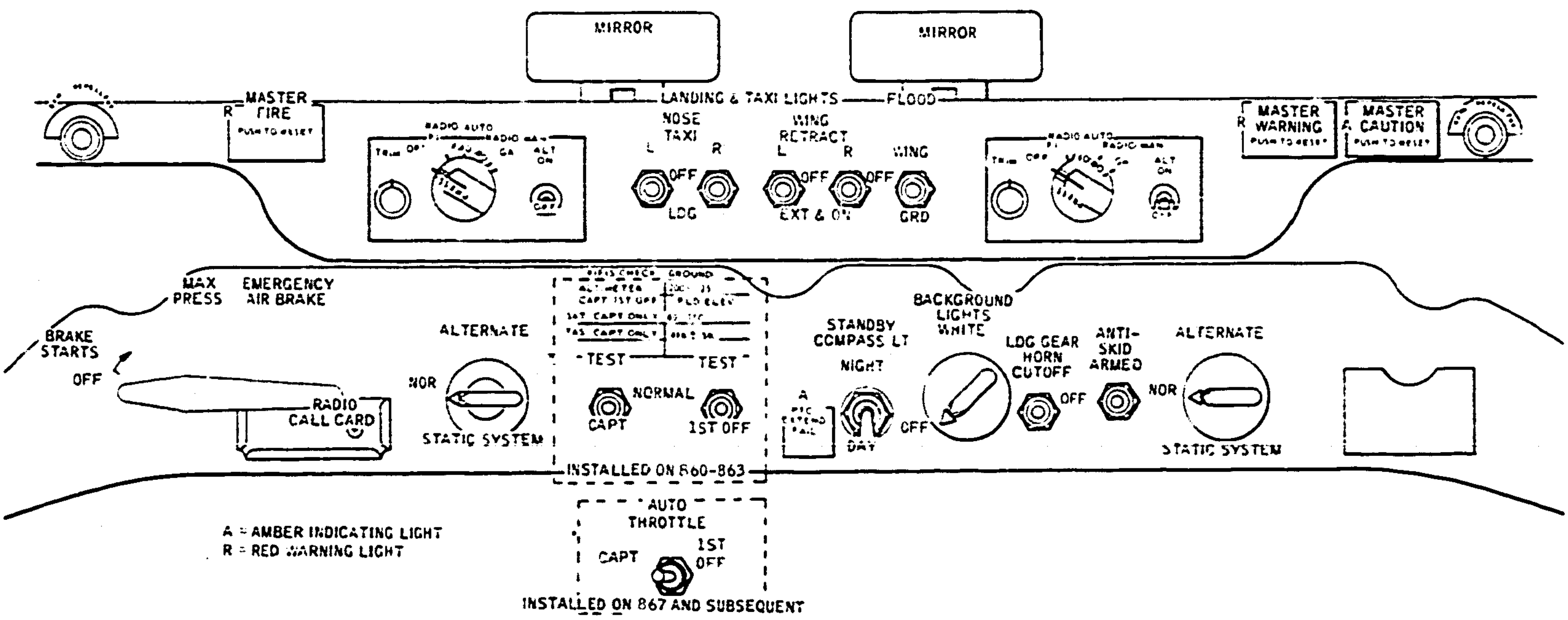


HA2-3051E

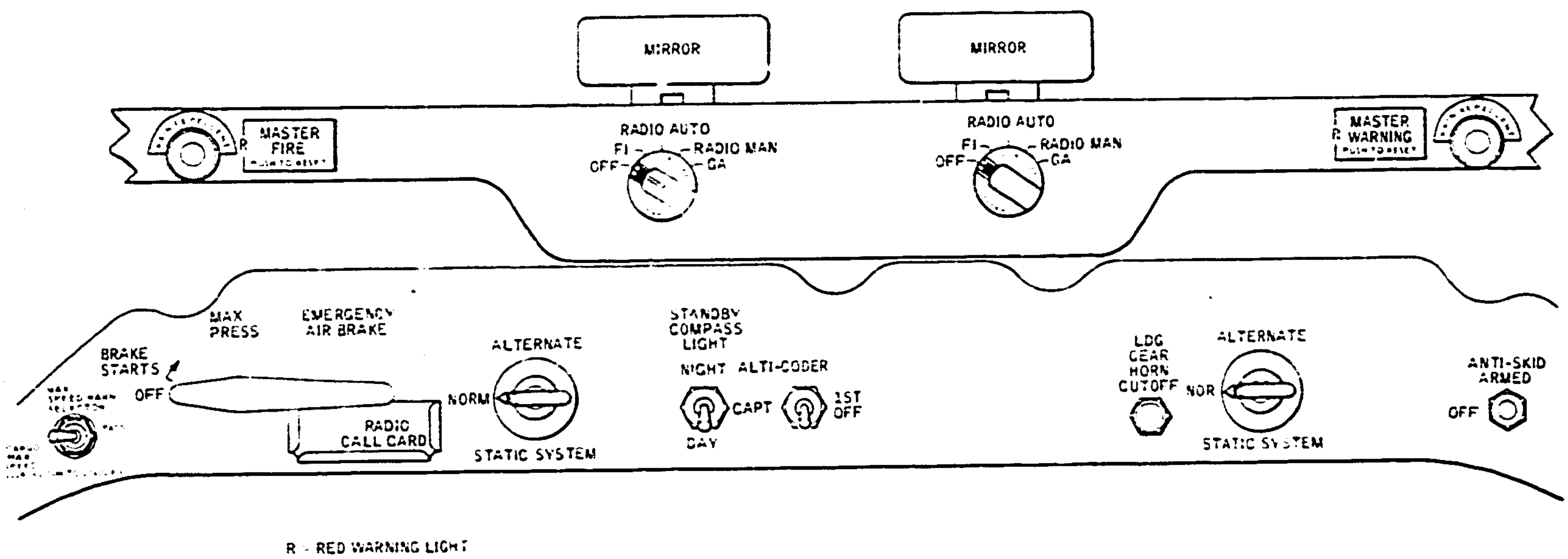
Glareshield Instrument Panel
Figure 1



Glareshield Instrument Panel
Figure 1

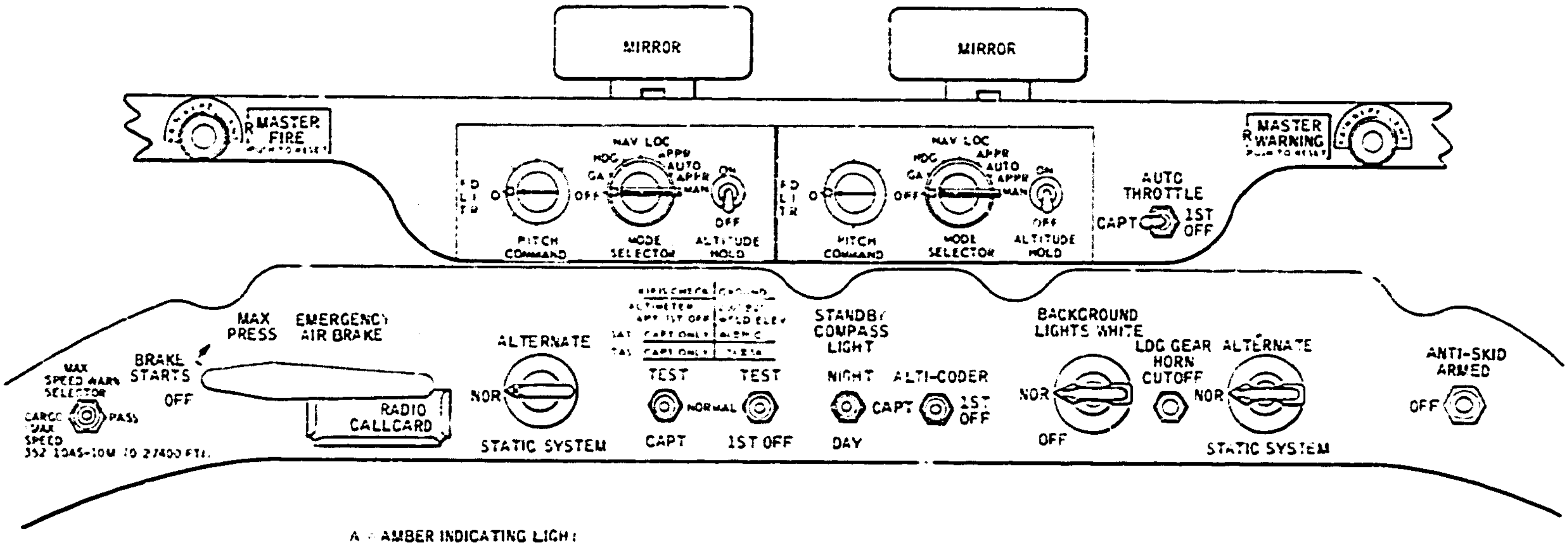


Glareshield Instrument Panel
Figure 1



HA2-3616

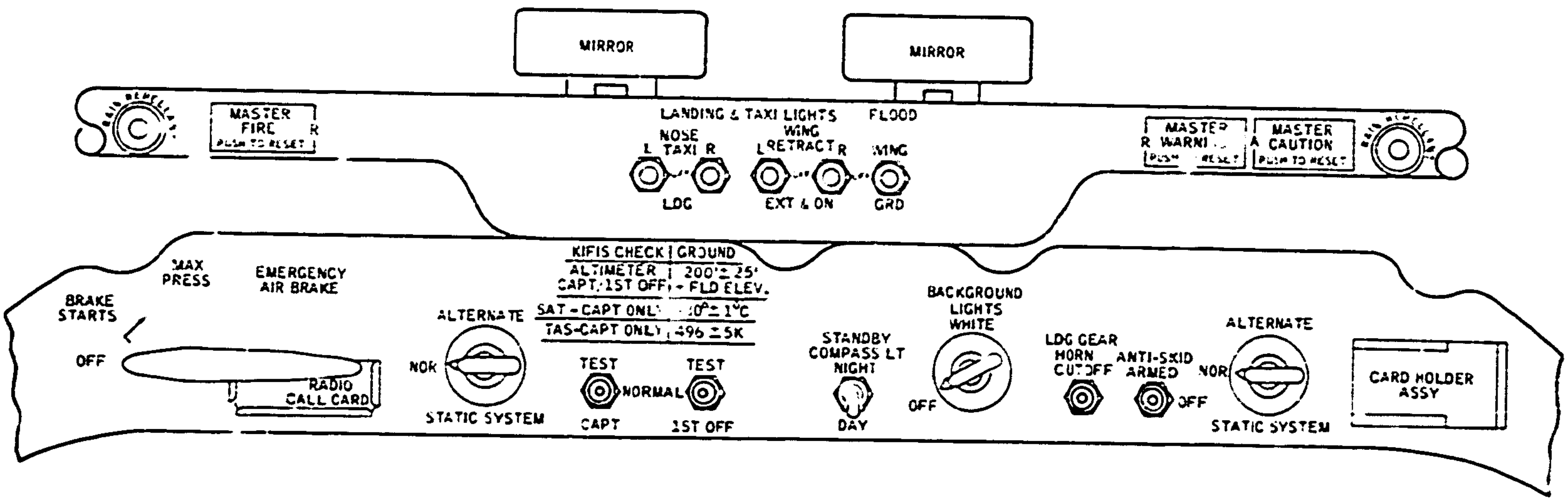
Glareshield Instrument Panel
Figure 1



A = AMBER INDICATING LIGHT
R = RED WARNING LIGHT

IIA2-3650R

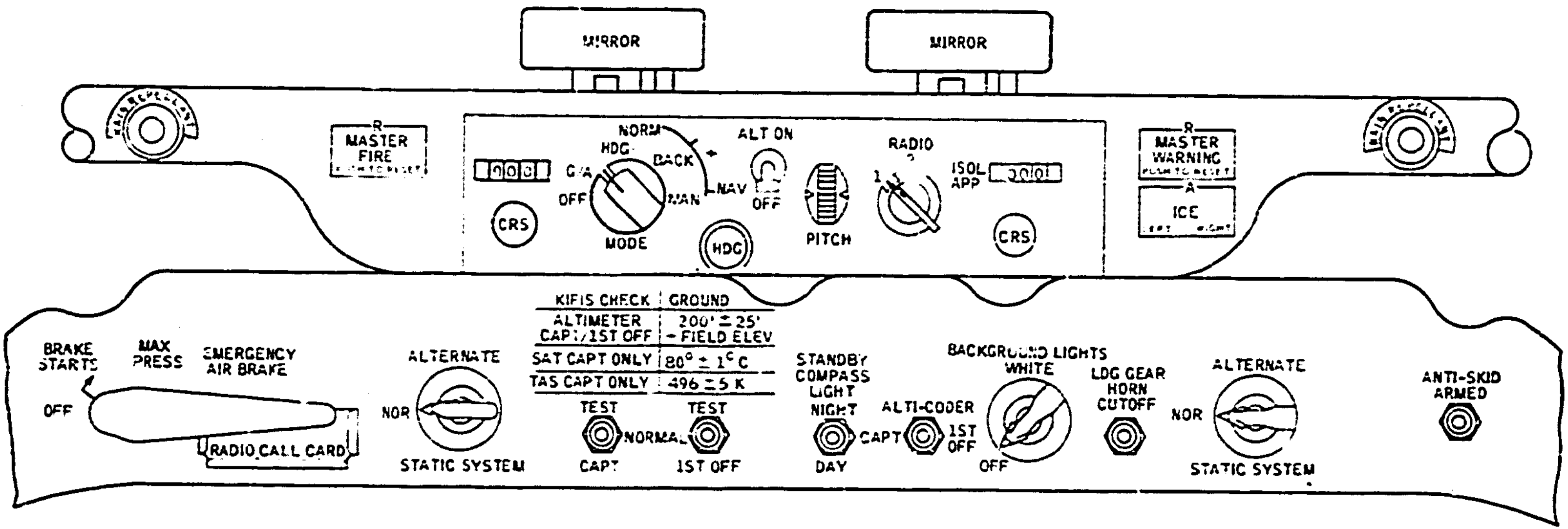
Glareshield Instrument Panel
Figure 1



R = RED WARNING LIGHT
A = AMBER INDICATING LIGHT

HA2-3699A

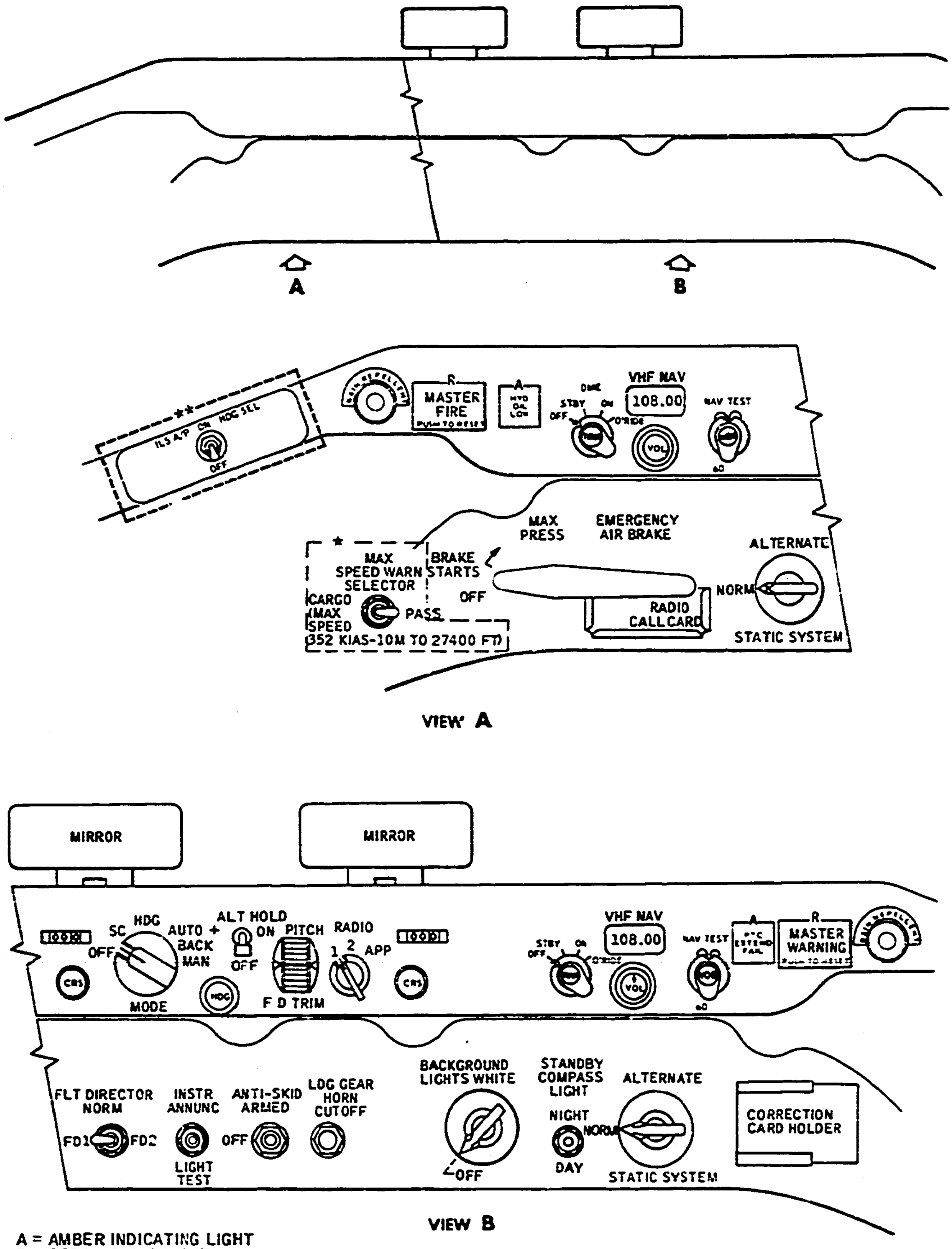
Glareshield Instrument Panel
Figure 1



A = AMBER INDICATING LIGHT
R = RED WARNING LIGHT

HA2-37518

Glareshield Instrument Panel
Figure 1

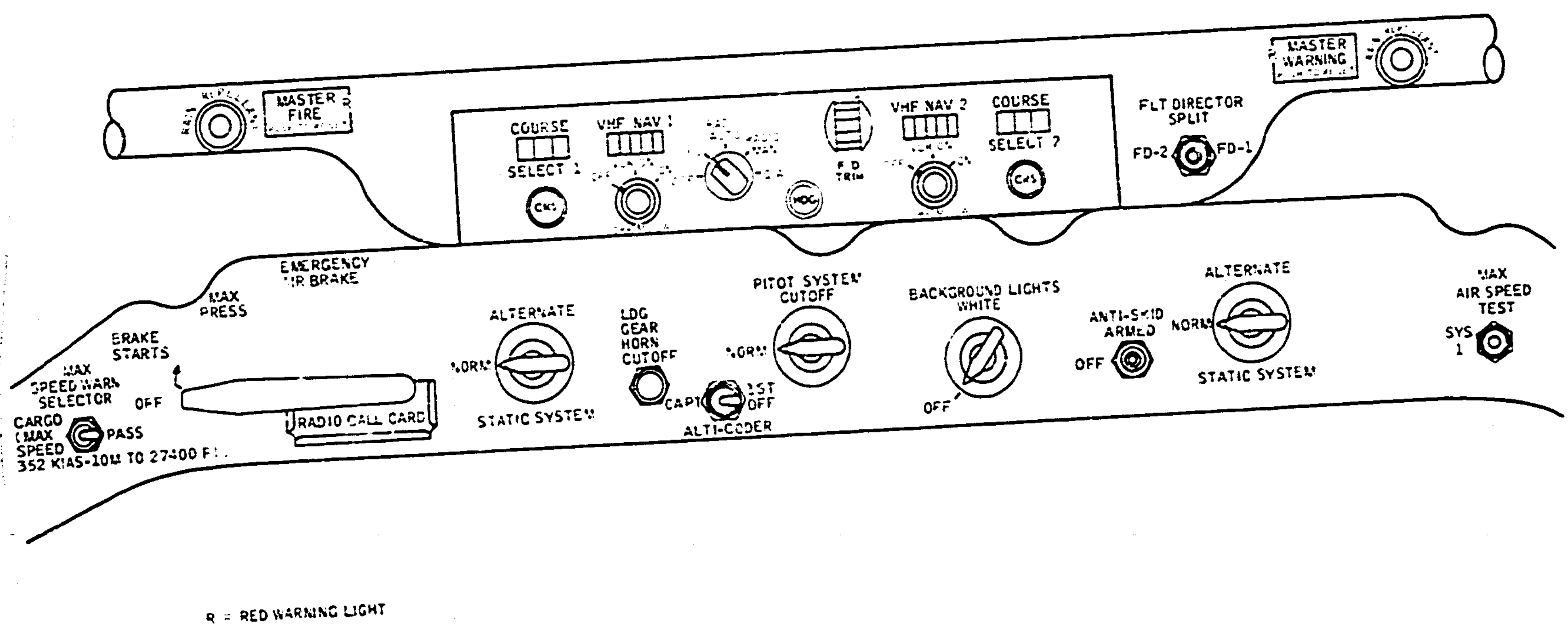


A = AMBER INDICATING LIGHT
R = RED WARNING LIGHT

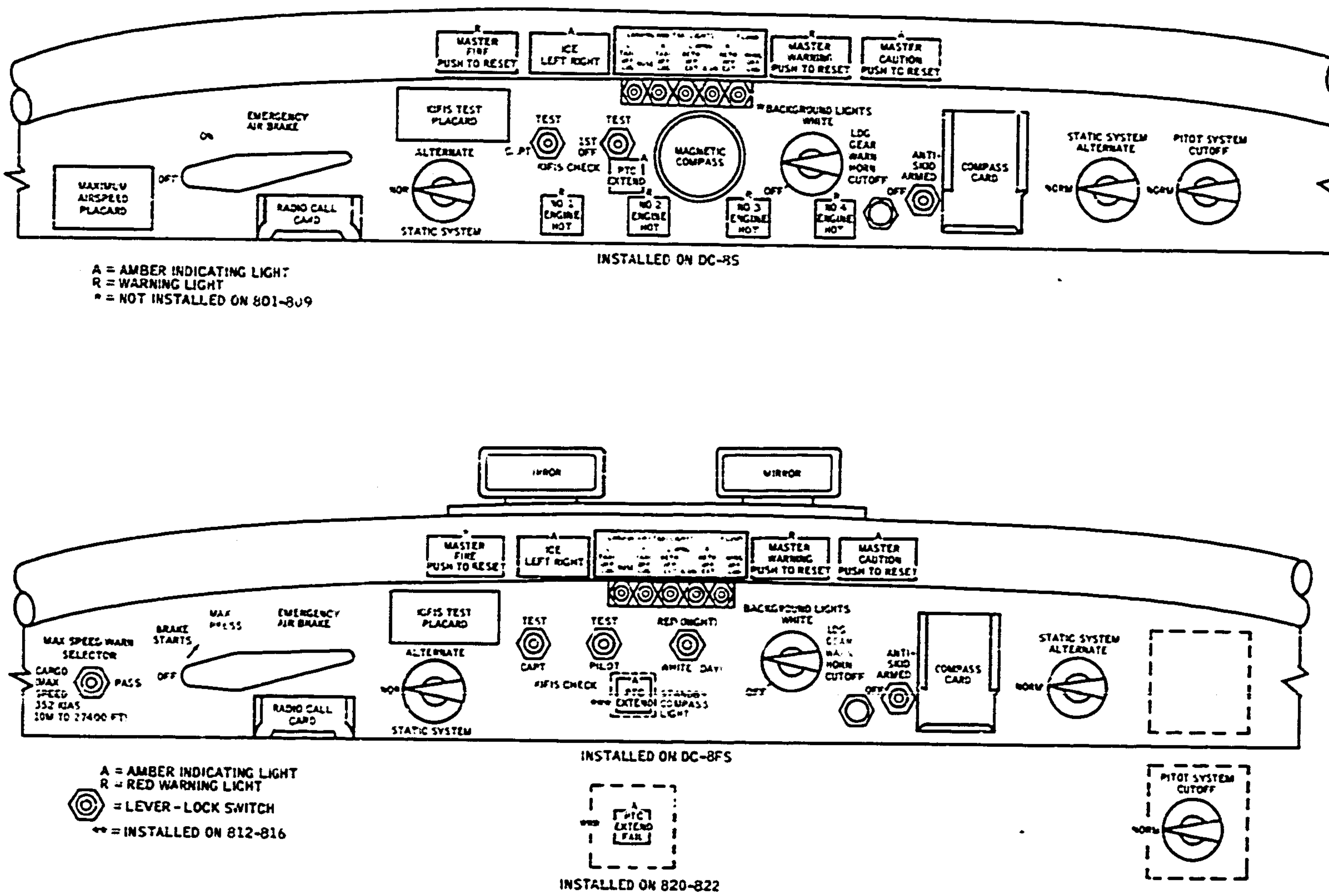
* INSTALLED ON JA8036 AND JA8044
** INSTALLED ON JA8043 AND SUBS.

HA2-4148C

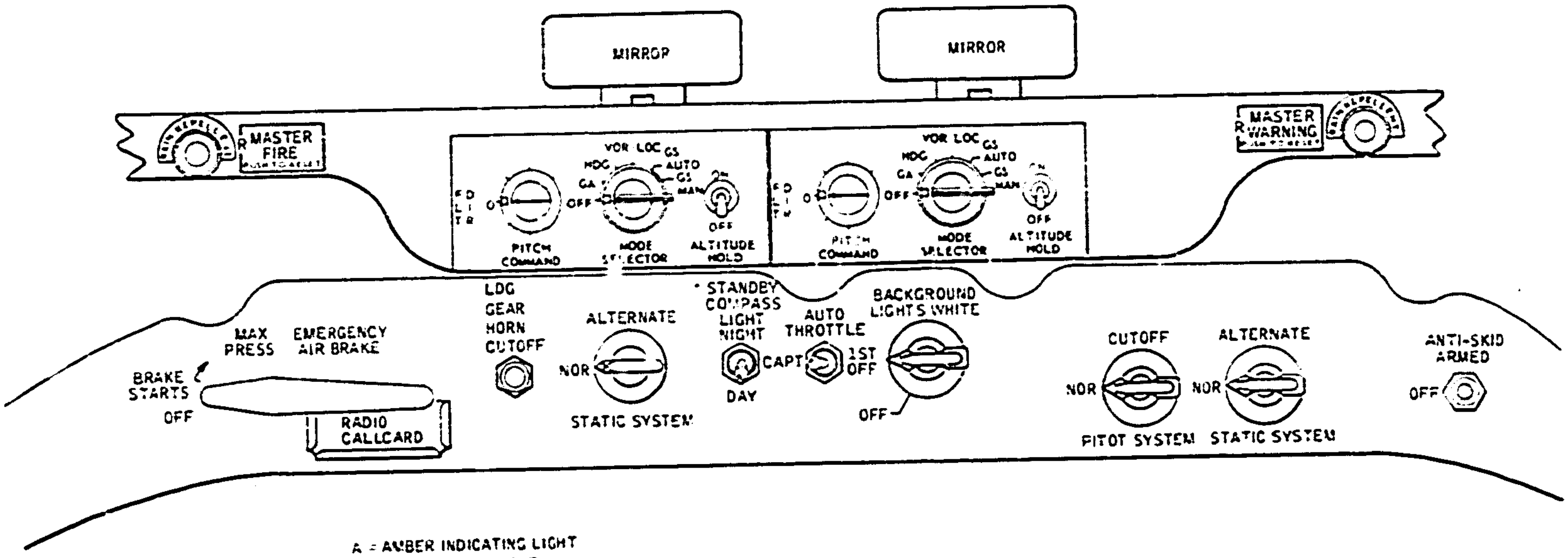
Glareshield Instrument Panel
Figure 1



Glareshield Instrument Panel
Figure 1

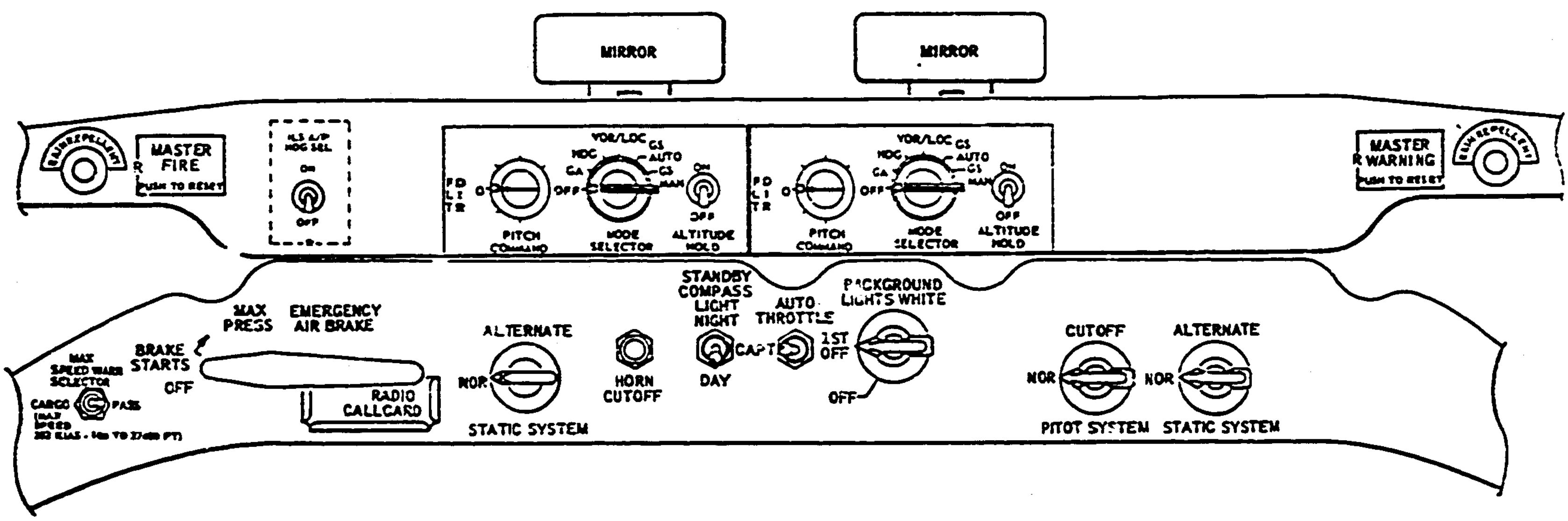


Glareshield Instrument Panel
Figure 1

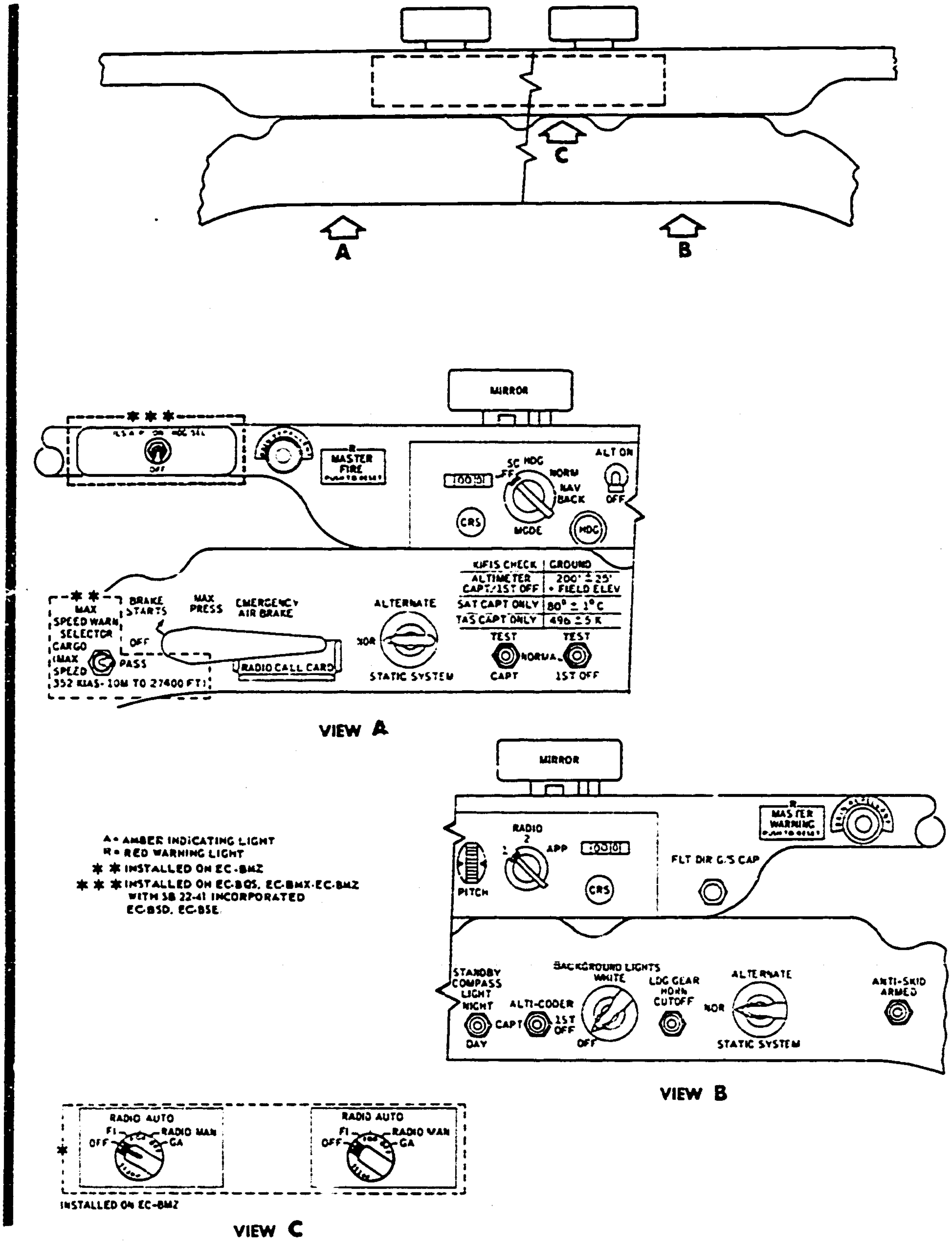


1IA2-4807

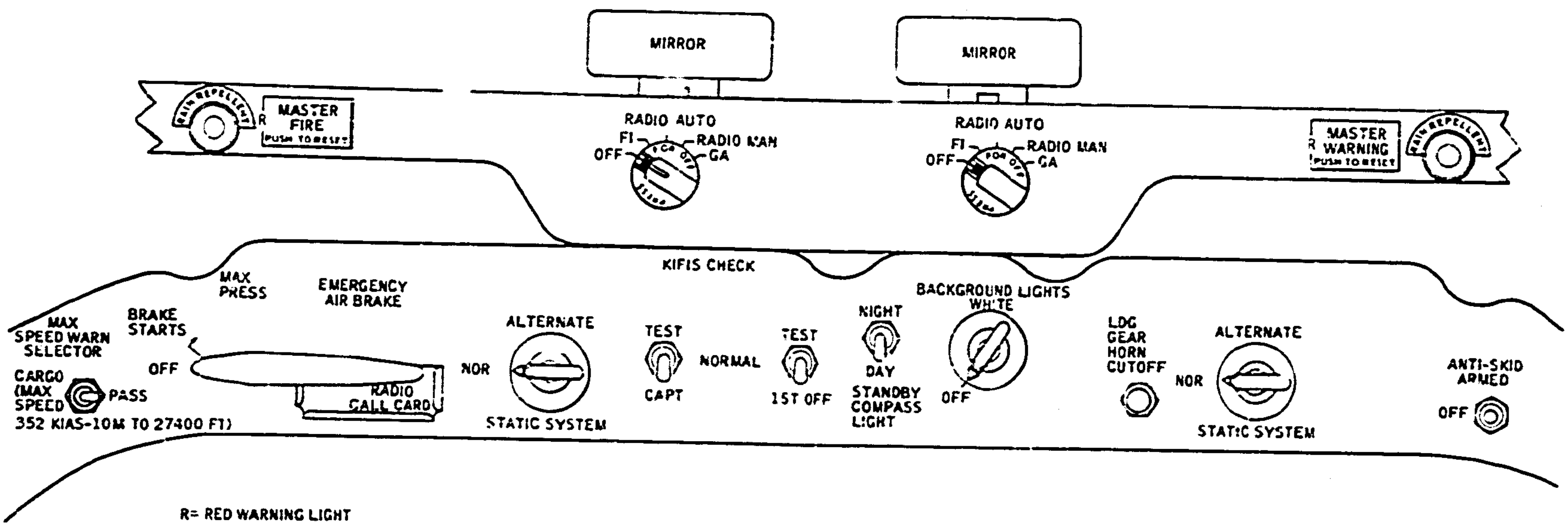
Glareshield Instrument Panel
Figure 1



Glareshield Instrument Panel
Figure 1

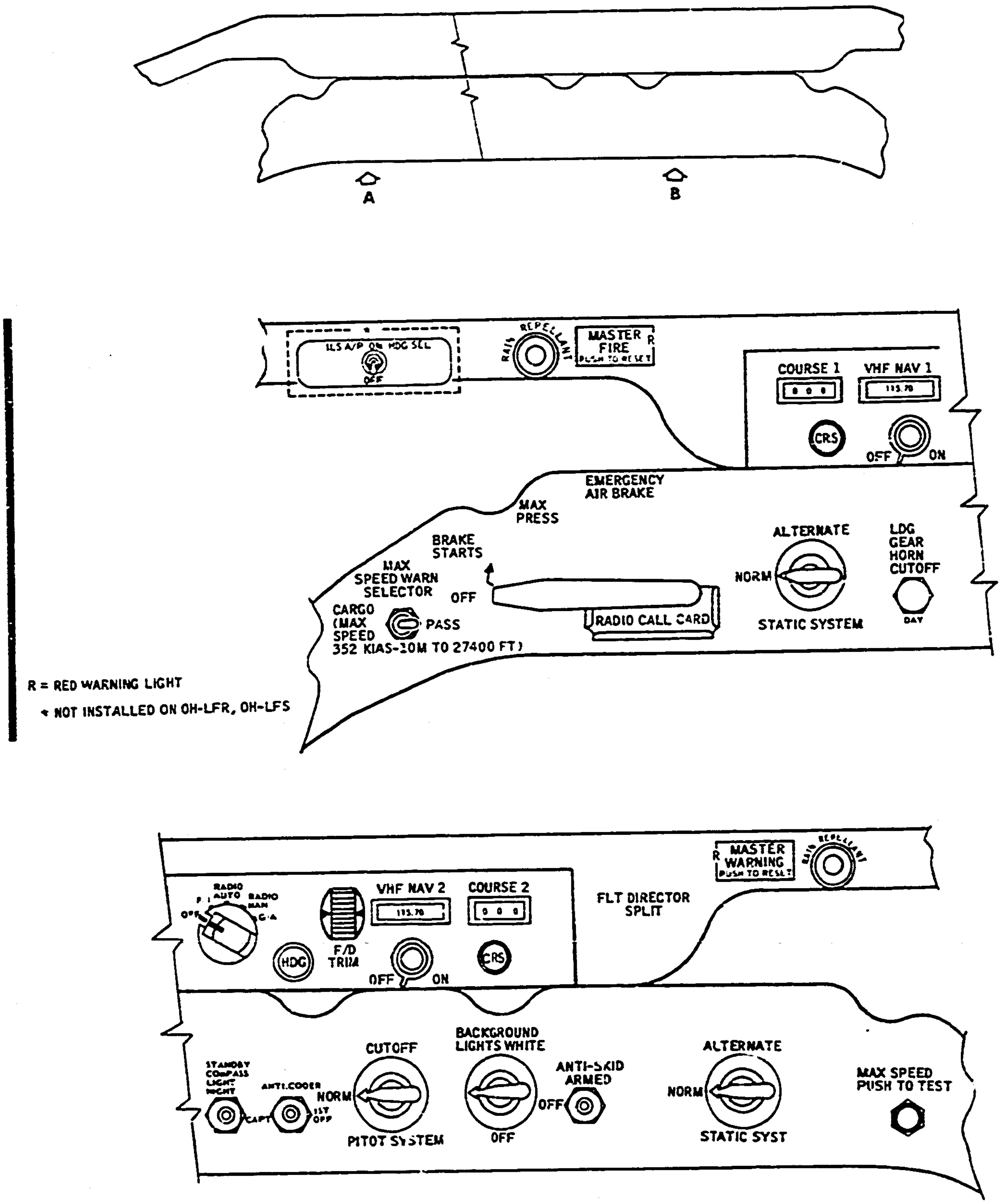


Glareshield Instrument Panel
Figure 1



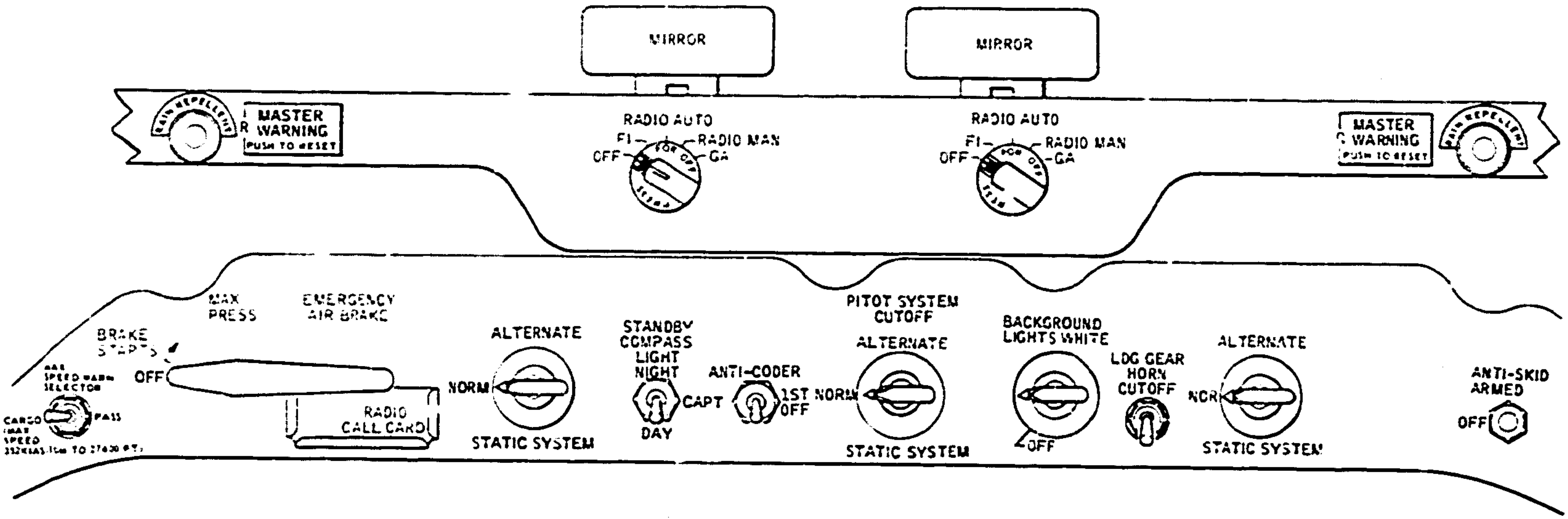
HA2-4829

Glareshield Instrument Panel
Figure 1



HA2-5610A

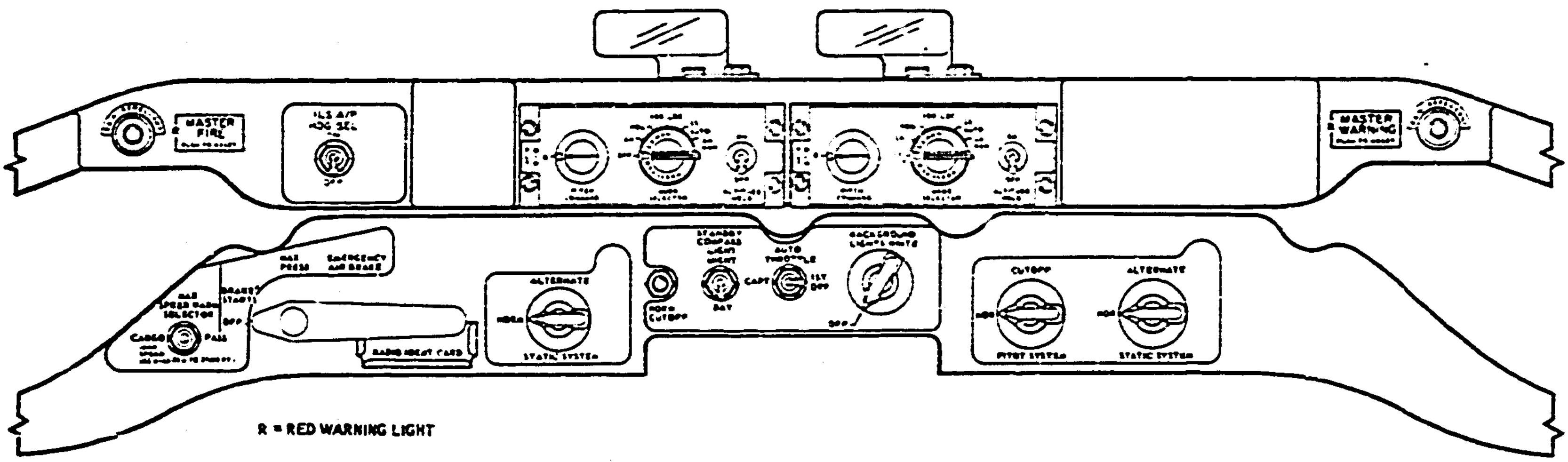
Glareshield Instrument Panel
Figure 1



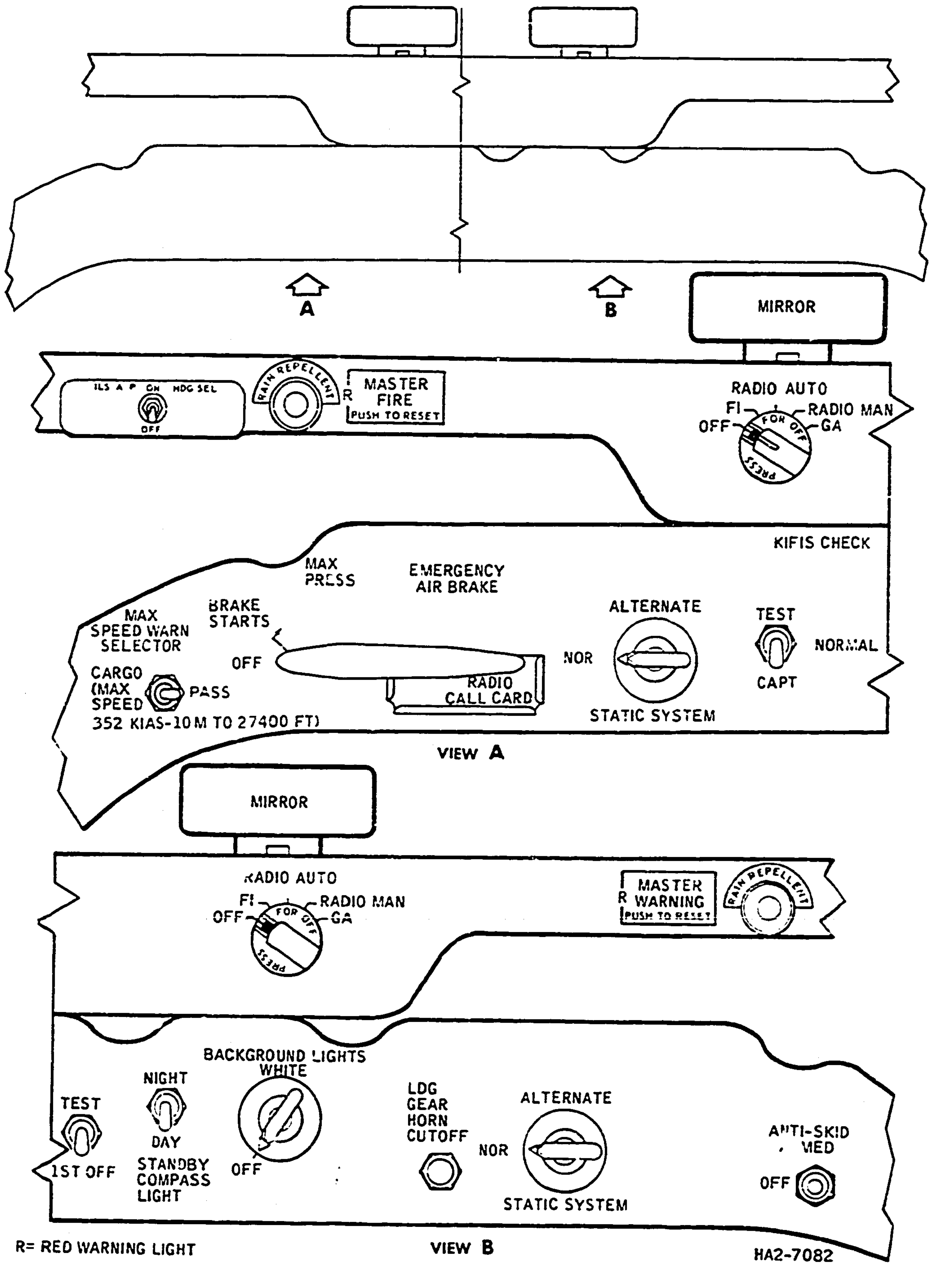
R RED WARNING LIGHT

Glareshield Instrument Panel

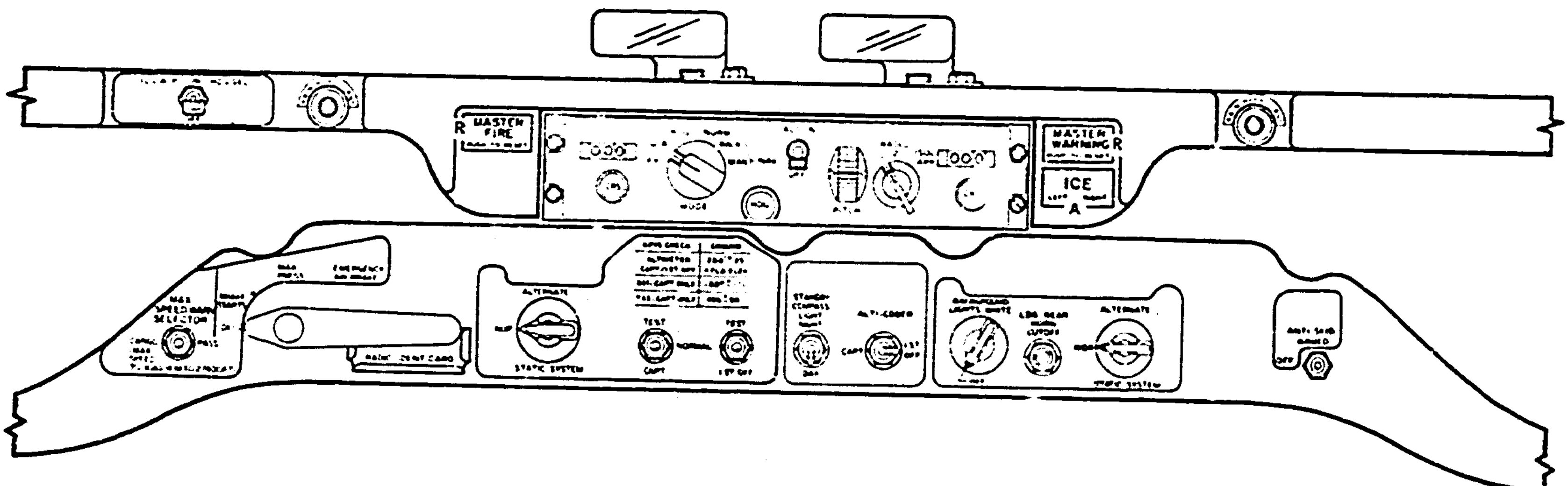
Figure 1



Glareshield Instrument Panel
Figure 1



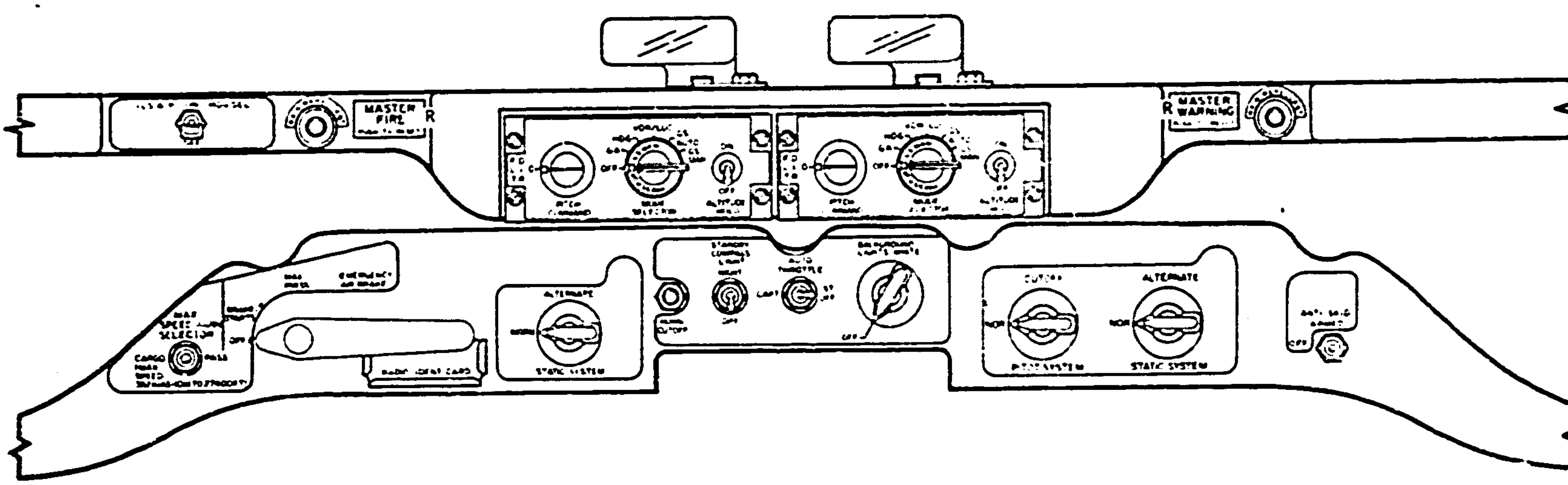
Glareshield Instrument Panel
Figure 1



A = AMBER INDICATING LIGHT
R = RED WARNING LIGHT

HA2-7164

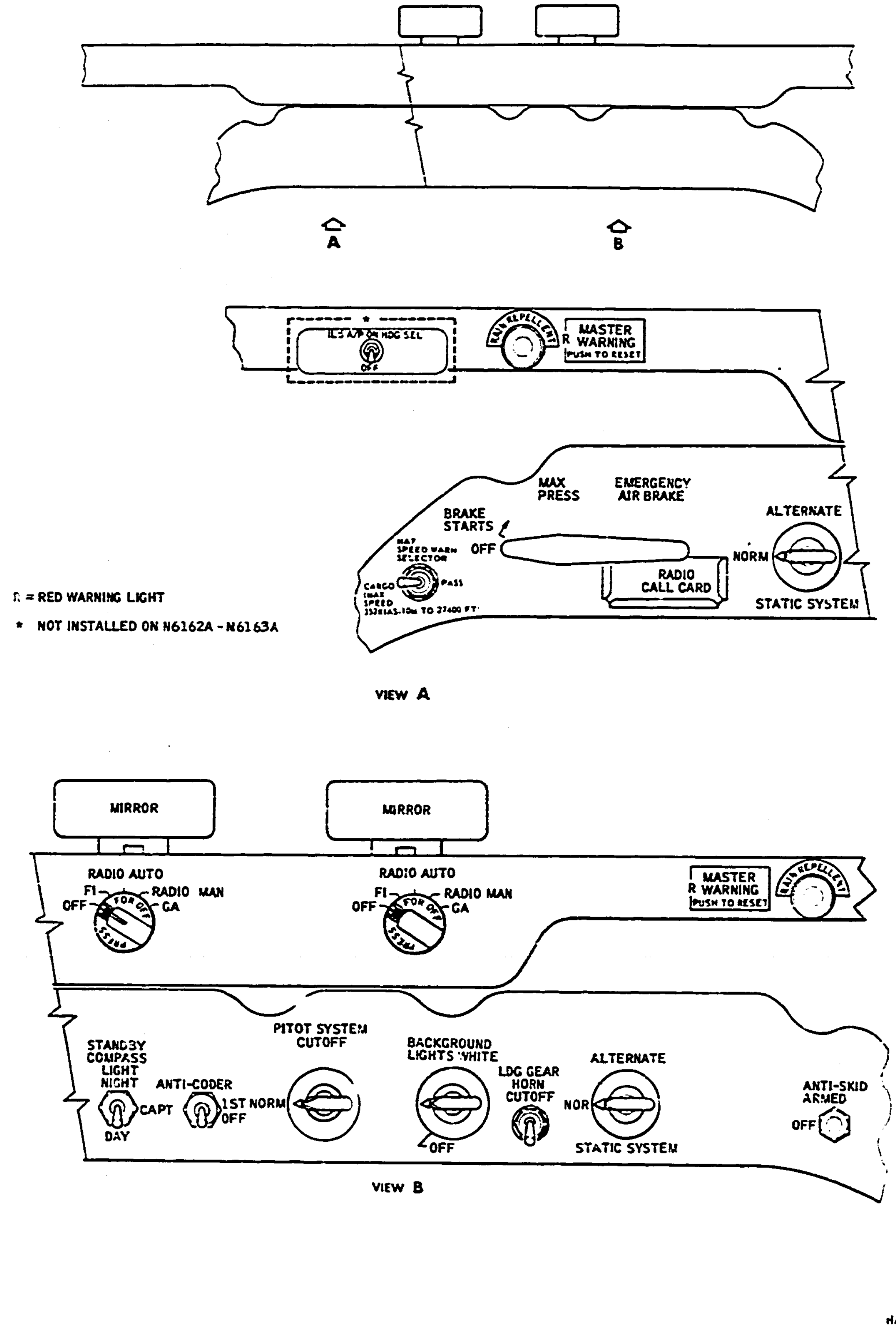
Glareshield Instrument Panel
Figure 1



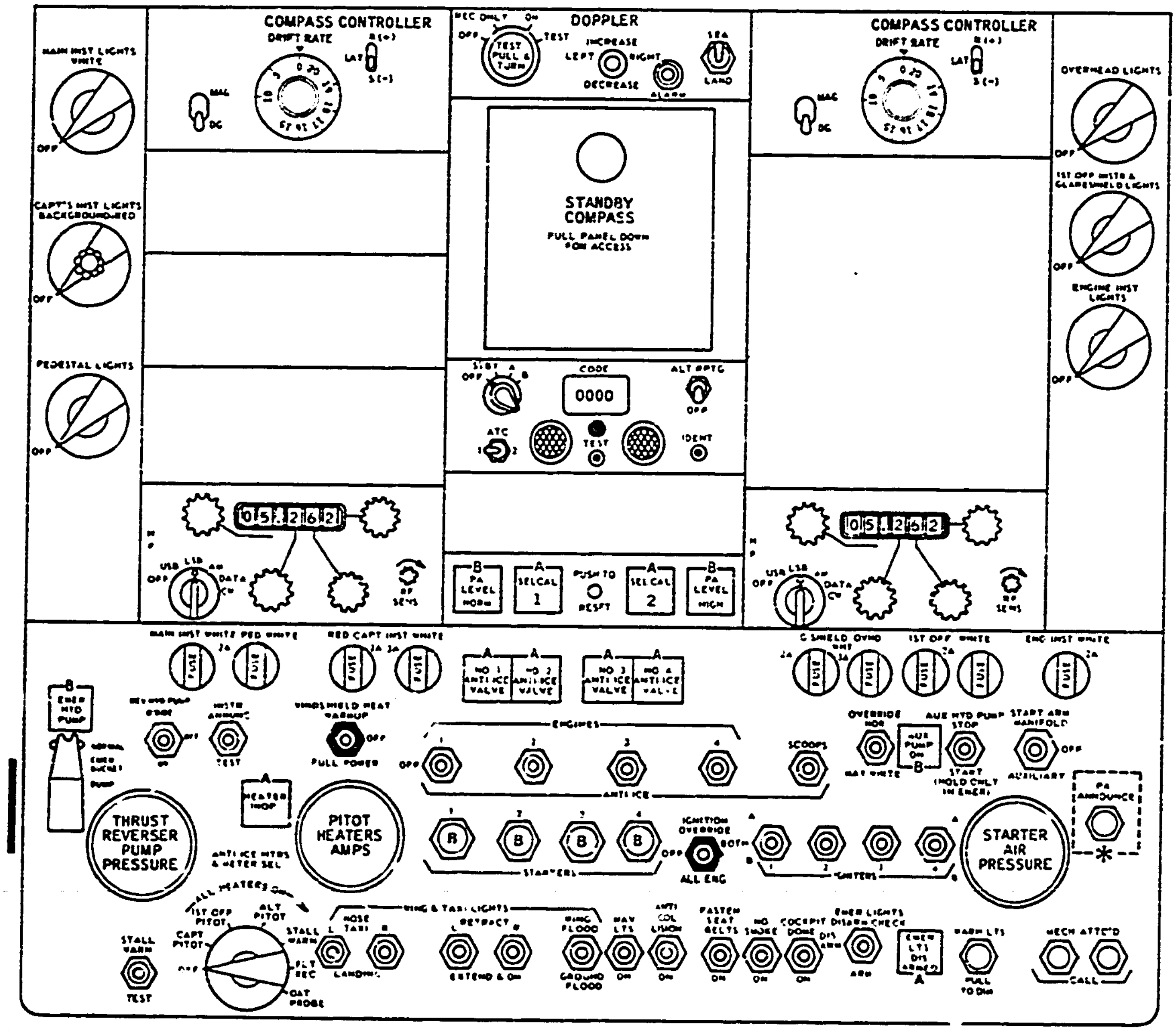
R = RED WARNING LIGHT

HA2-7199

Glareshield Instrument Panel
Figure 1



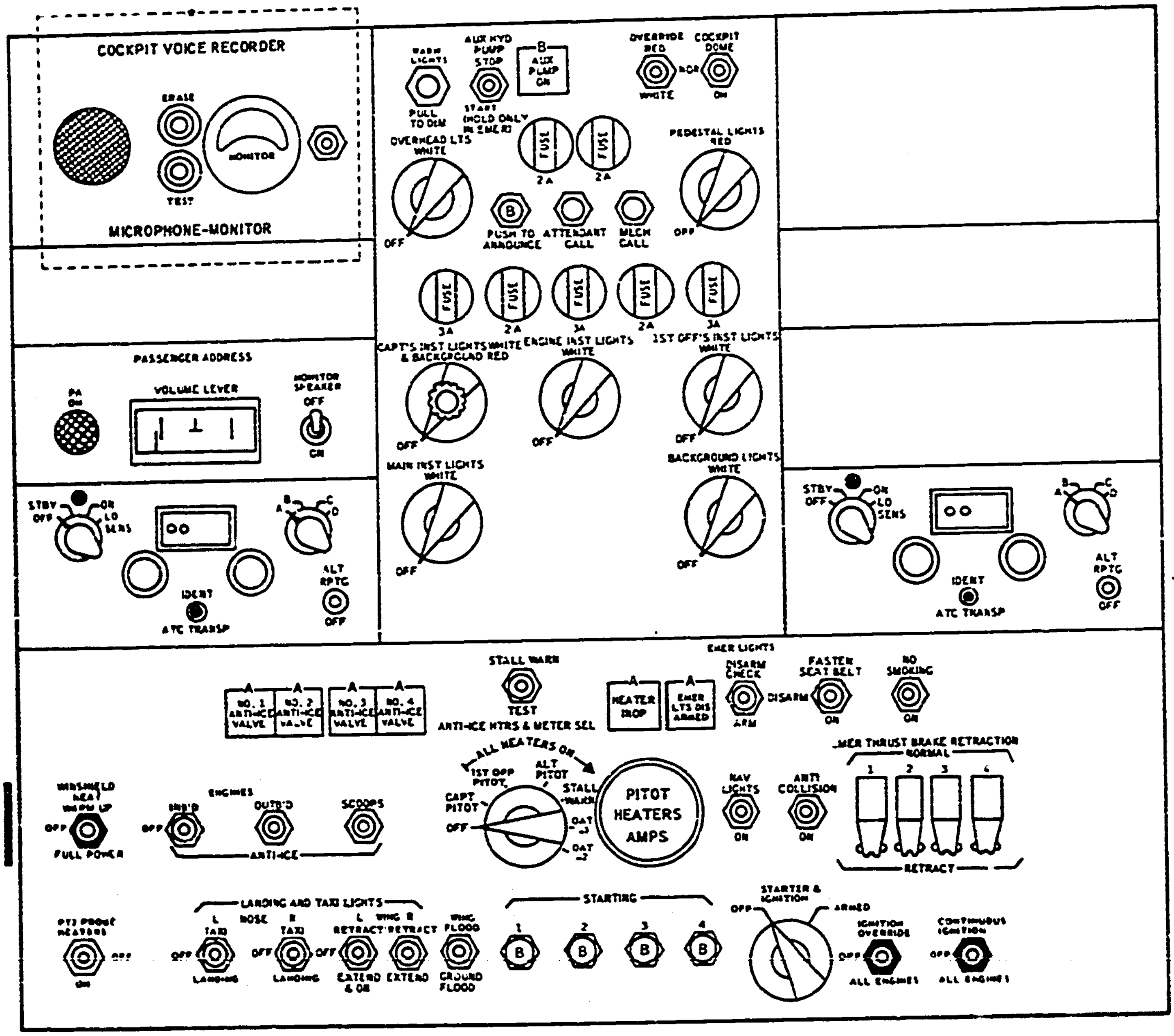
Glareshield Instrument Panel
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
= LEVER-LOCK SWITCH
▌✱ NOT INSTALLED ON 78

HA2-1212E

Overhead Switch Panel
Figure 1

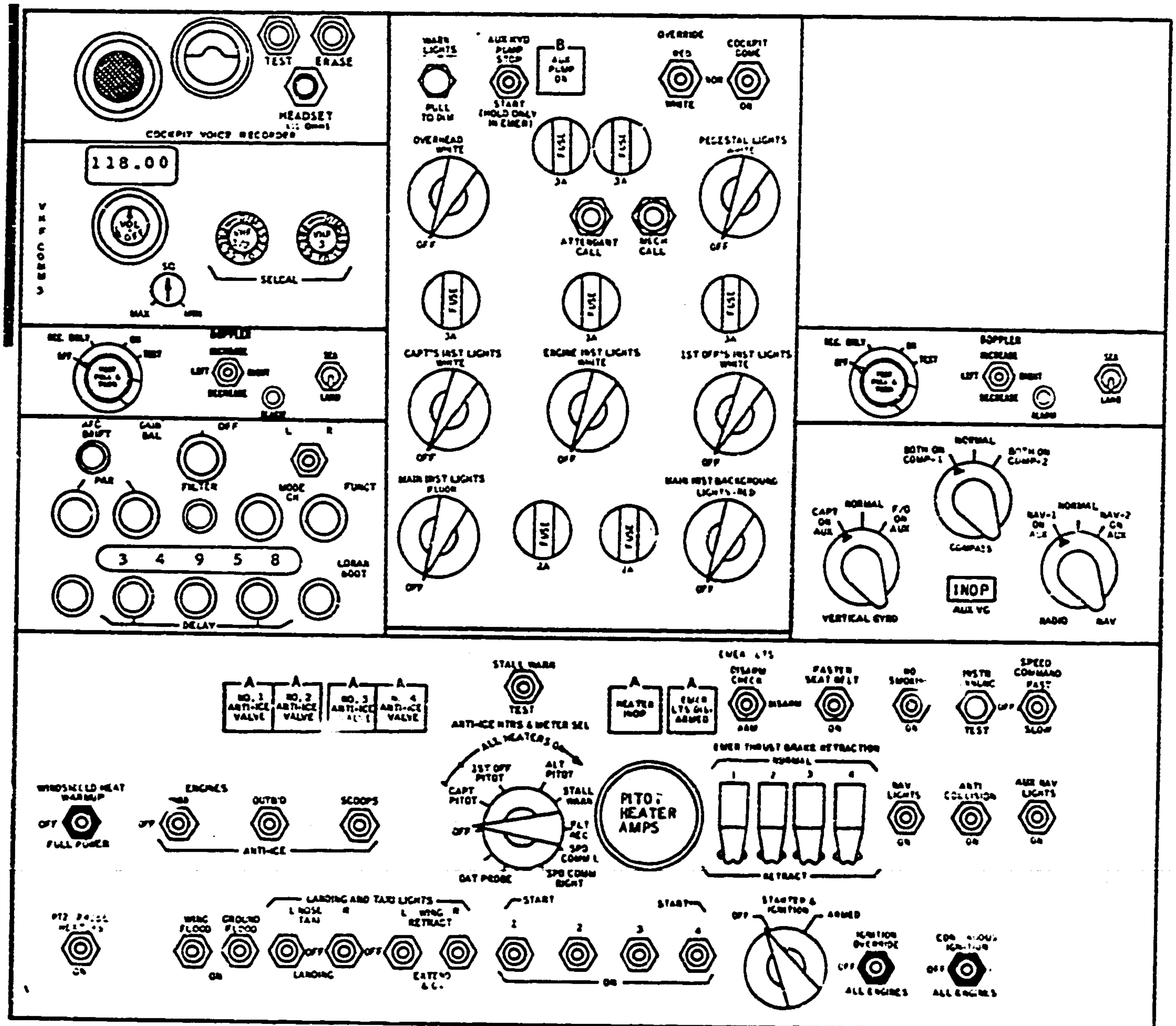


A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
LEVER-LOCK SWITCH
* INSTALLED ON N8077U-N8099U

HA2-1254E

Overhead Switch Panel
Figure 1

Printed in U.S.A.

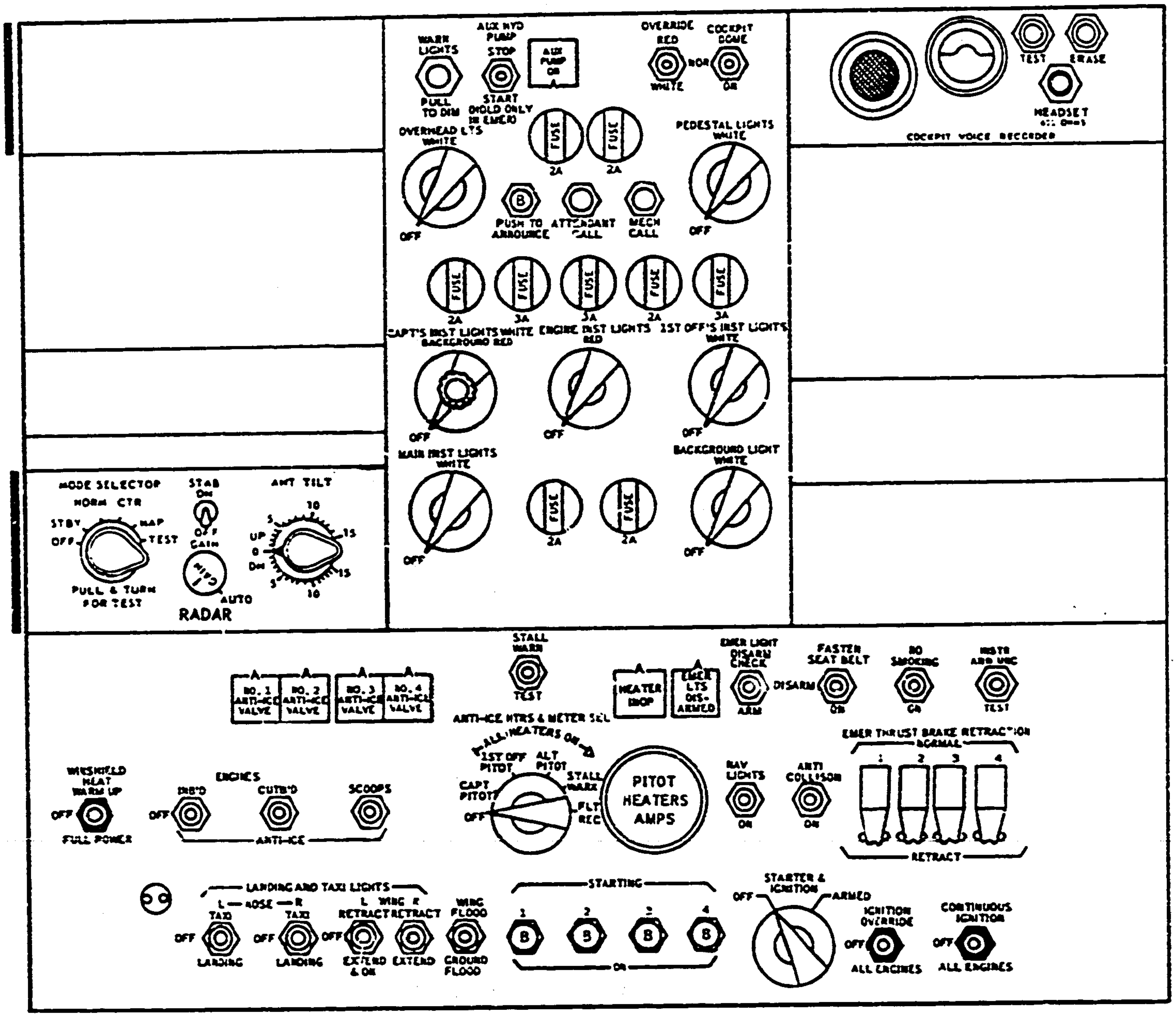


A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
= LEVER LOCK SWITCH

HA2-1328B

Overhead Switch Panel
Figure 1

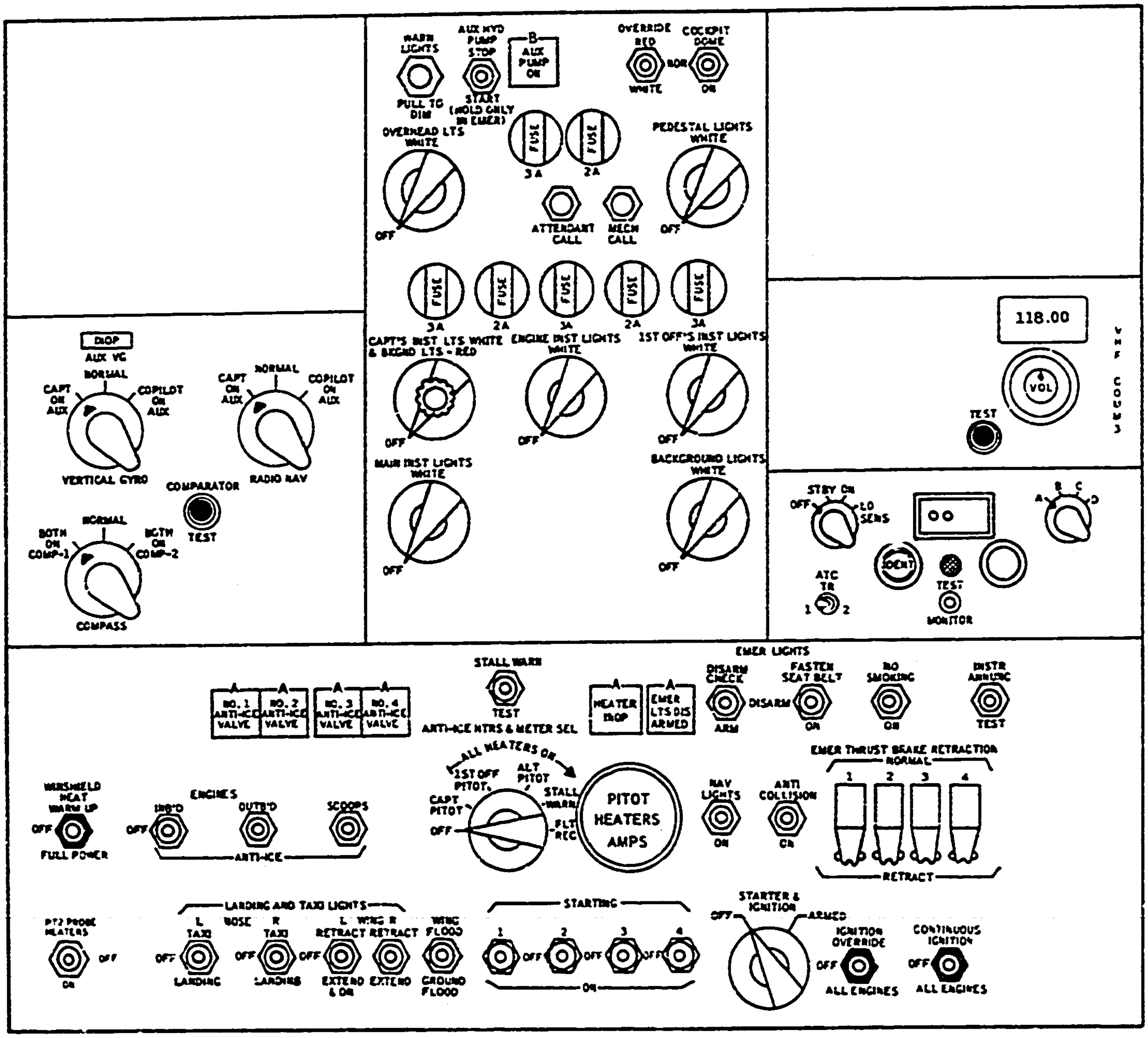
Printed in U.S.A.



A AMBER INDICATING LIGHT
B BLUE INDICATING LIGHT
LEVER-LOCK SWITCH

HA2-2360A

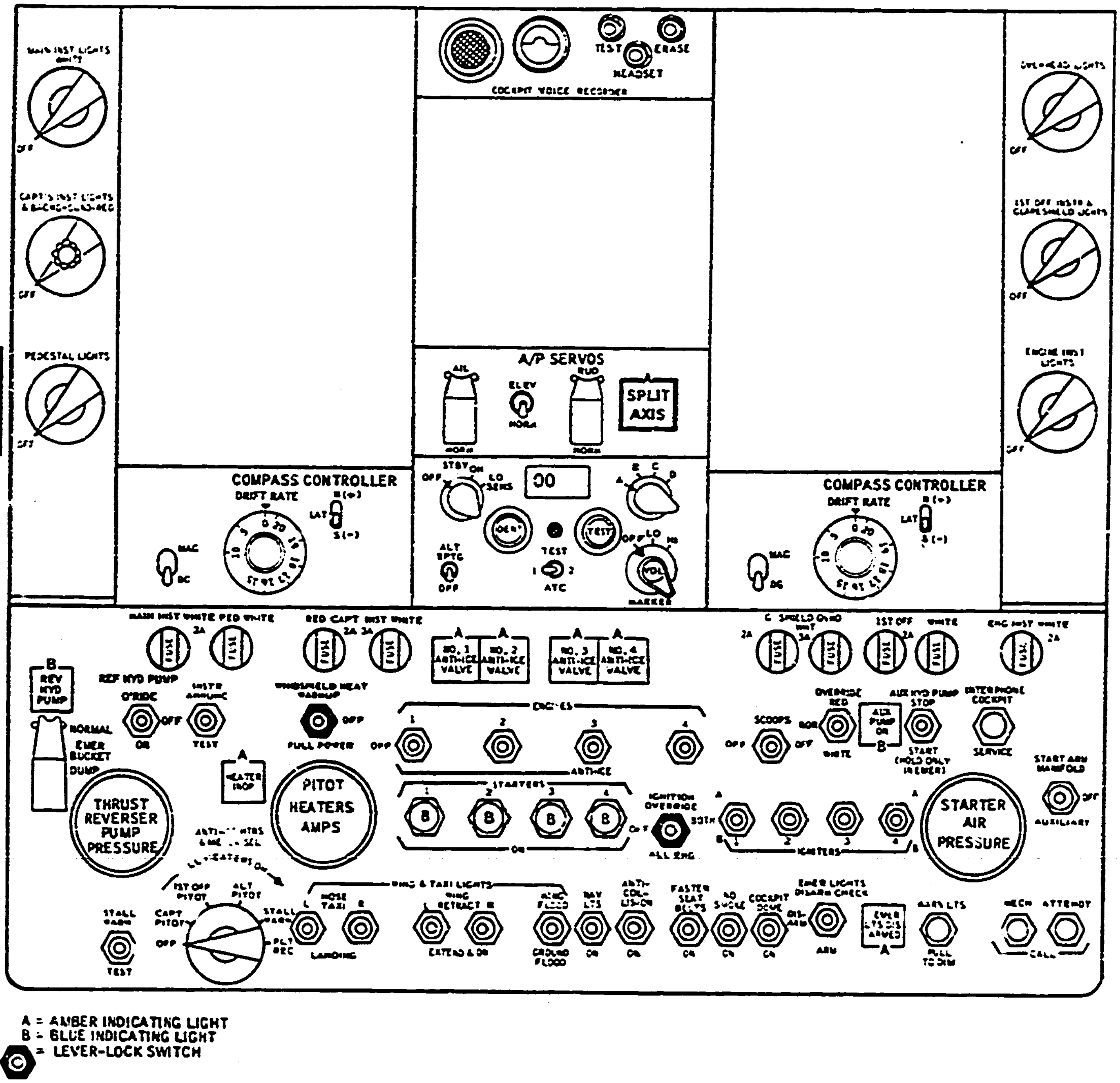
Overhead Switch Panel
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
LEVER-LOCK SWITCH

HA2-2967B

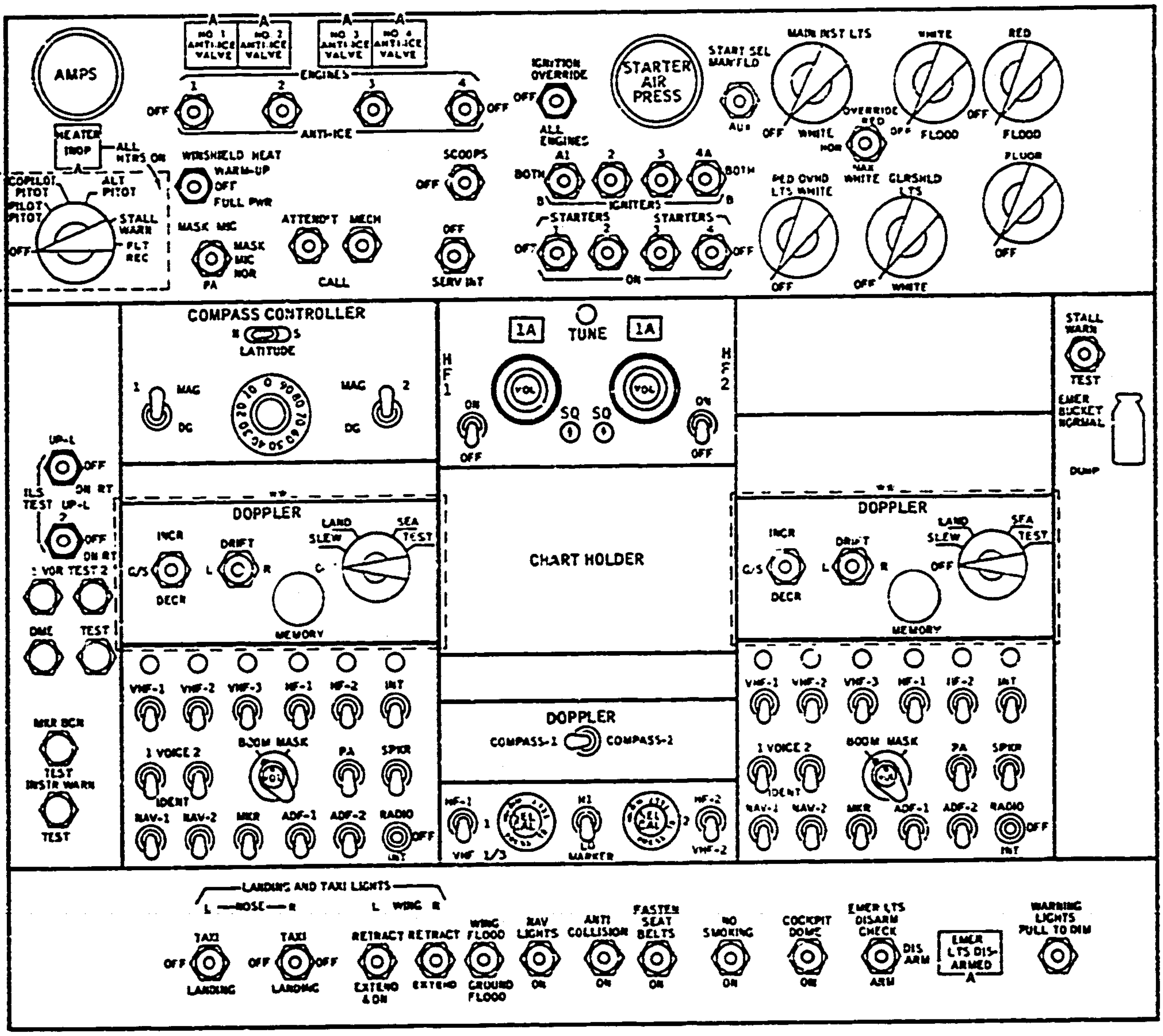
Overhead Switch Panel
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
= LEVER-LOCK SWITCH

HA2-29683

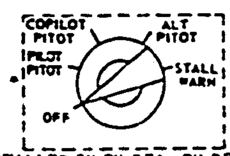
Overhead Switch Panel
Figure 1



A = AMBER INDICATING LIGHT

= LEVER LOCK SWITCH

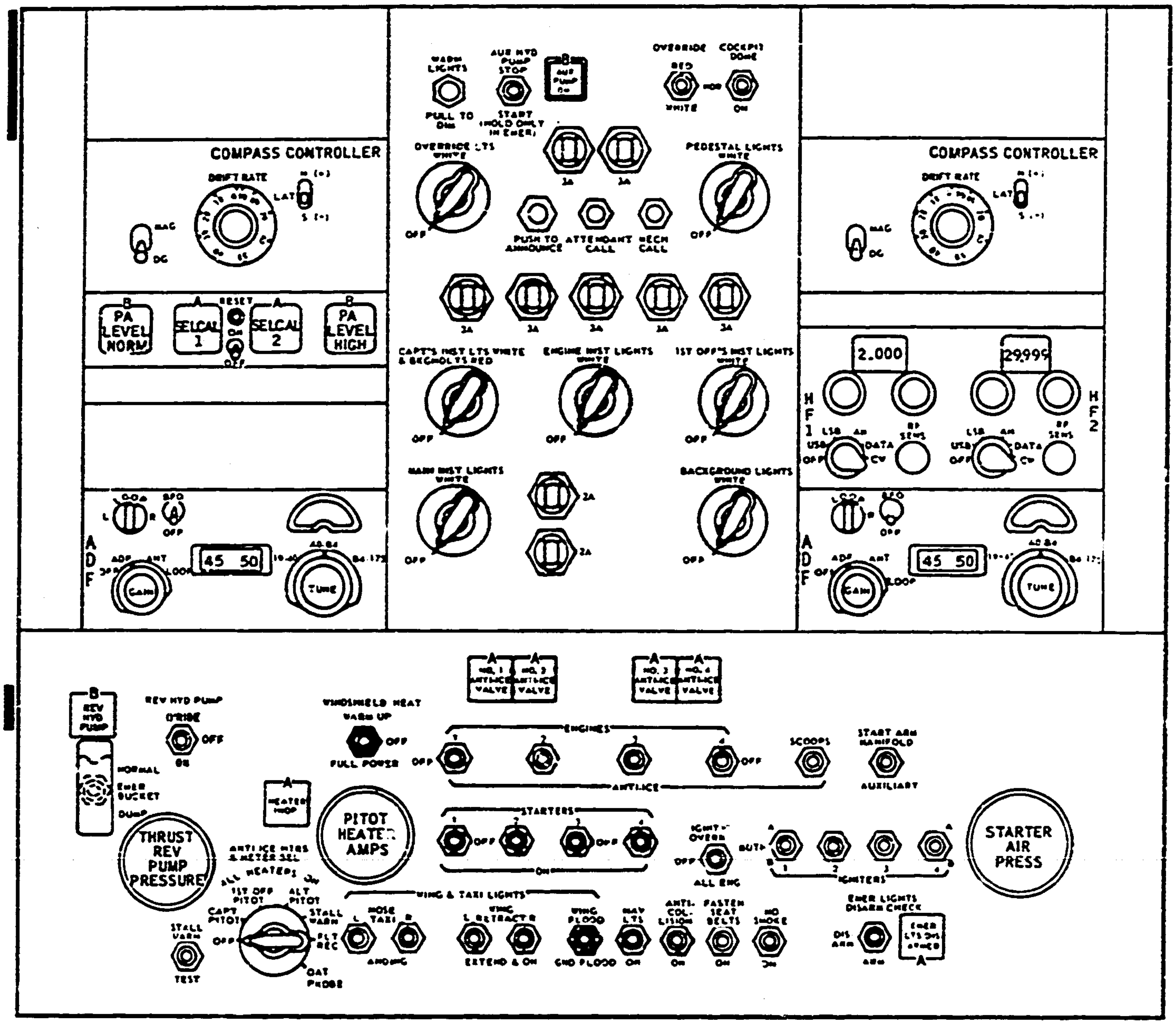
** = NOT INSTALLED ON PH-DEF, PH-DEH



INSTALLED ON PH-DEA—PH-DEE

HA2-3052G

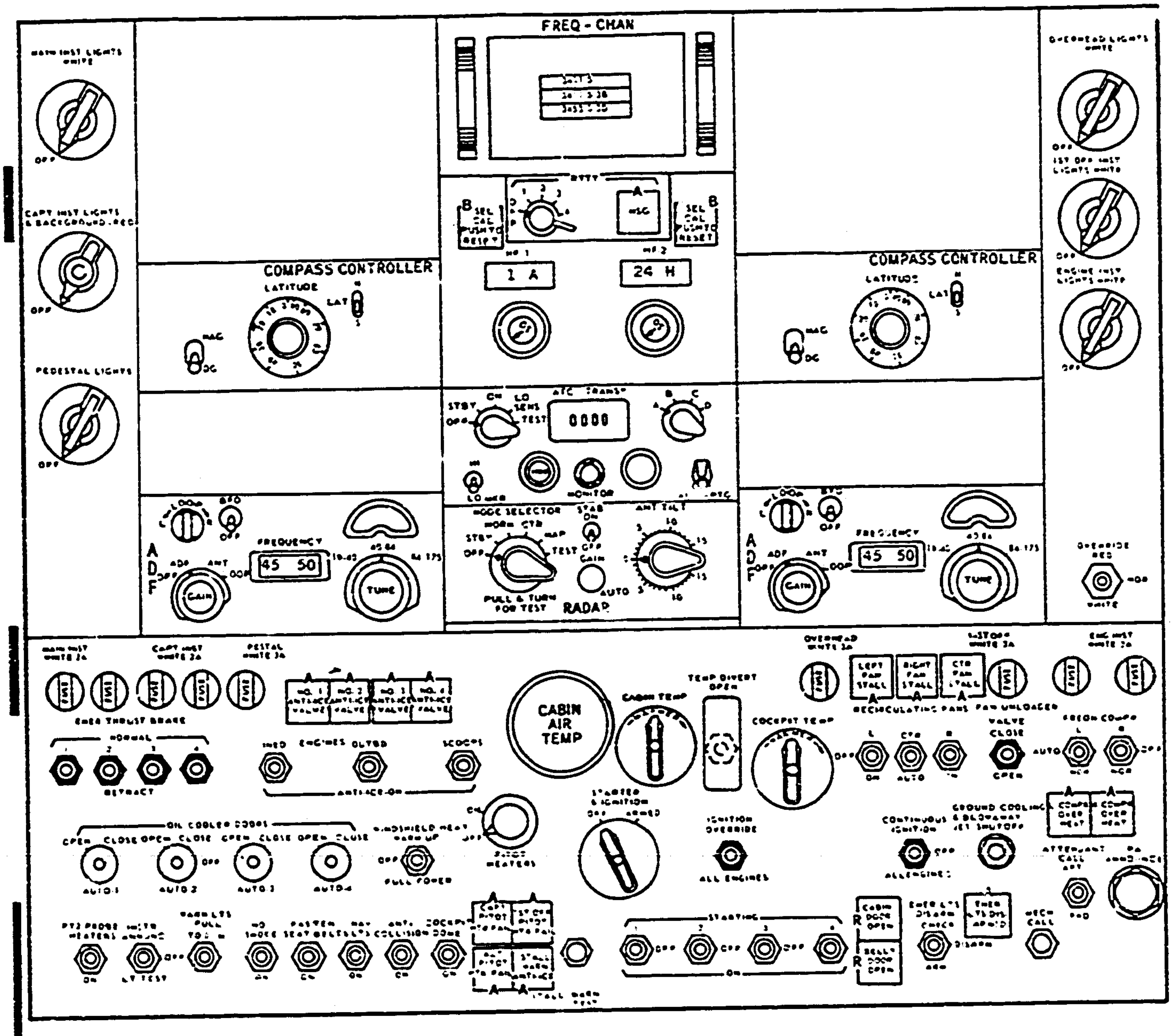
Overhead Switch Panel
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
= LEVER LOCK SWITCH

HA2-3580C

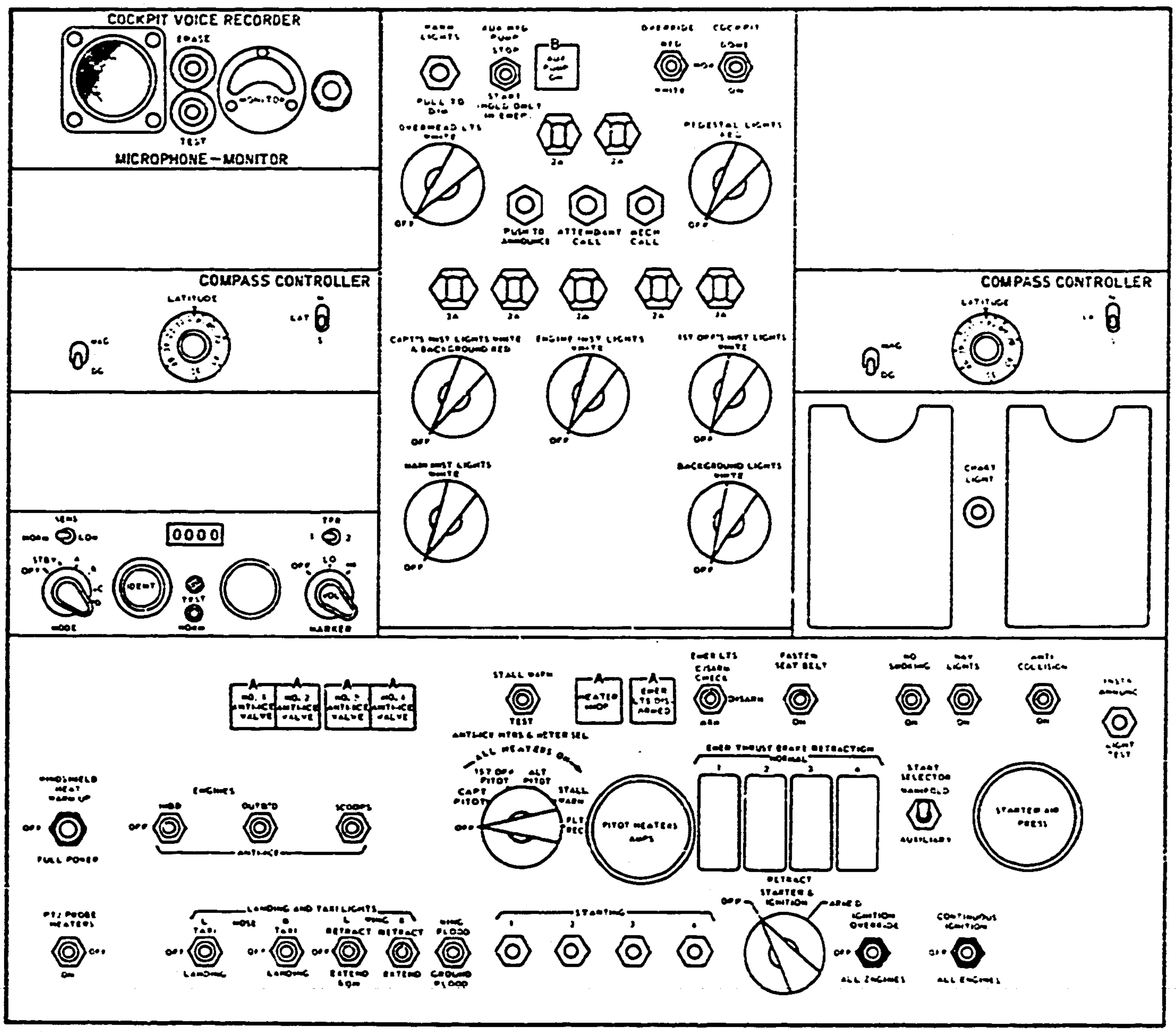
Overhead Switch Panel
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
= LEVER LOCK SWITCH

HA2-3600A

Overhead Switch Panel
Figure 1



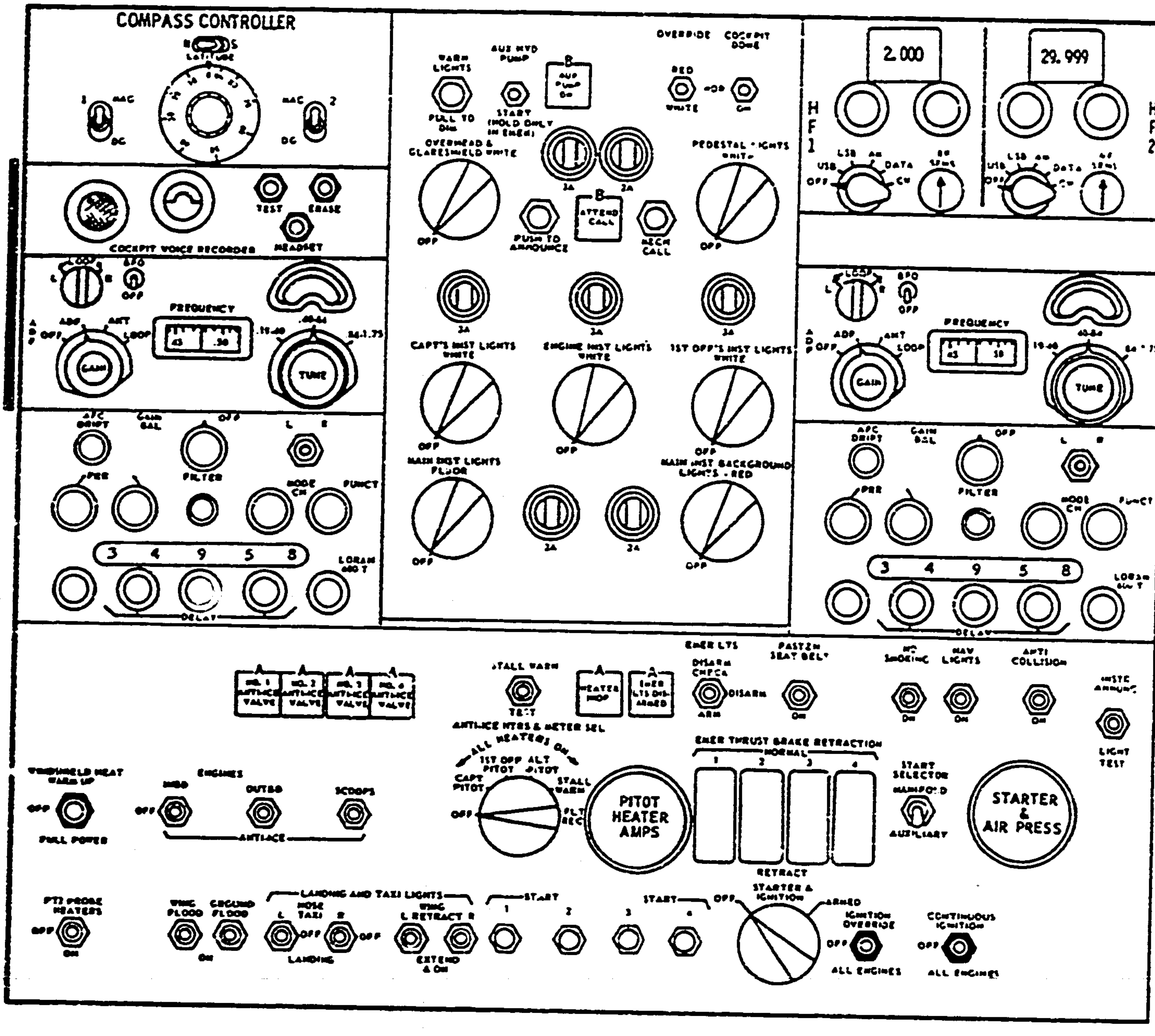
A = AMBER INDICATING LIGHT

B = BLUE INDICATING LIGHT

= LEVER-LOCK SWITCH

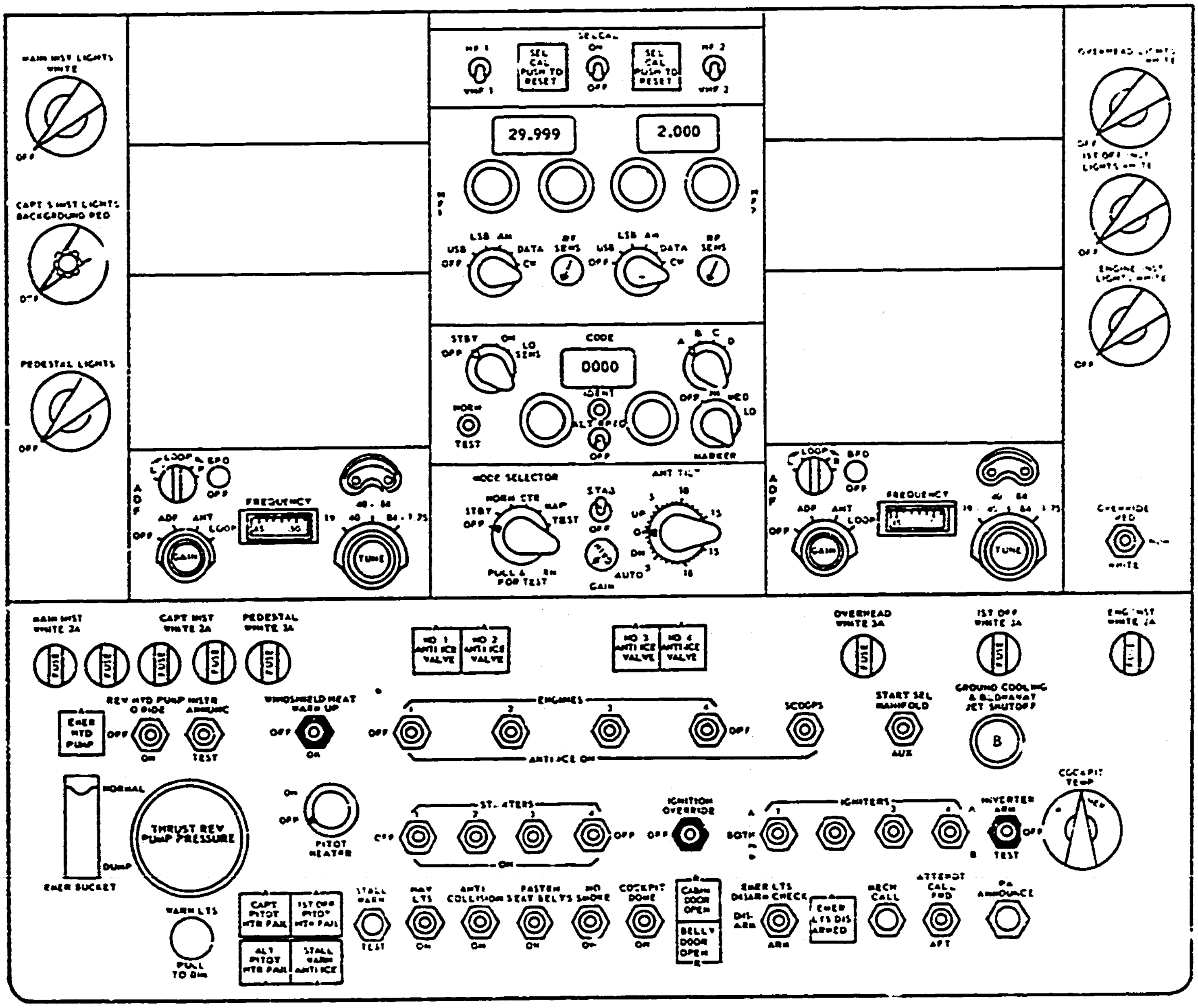
HA2-3617

Overhead Switch Panel
Figure 1



HA2-3651A

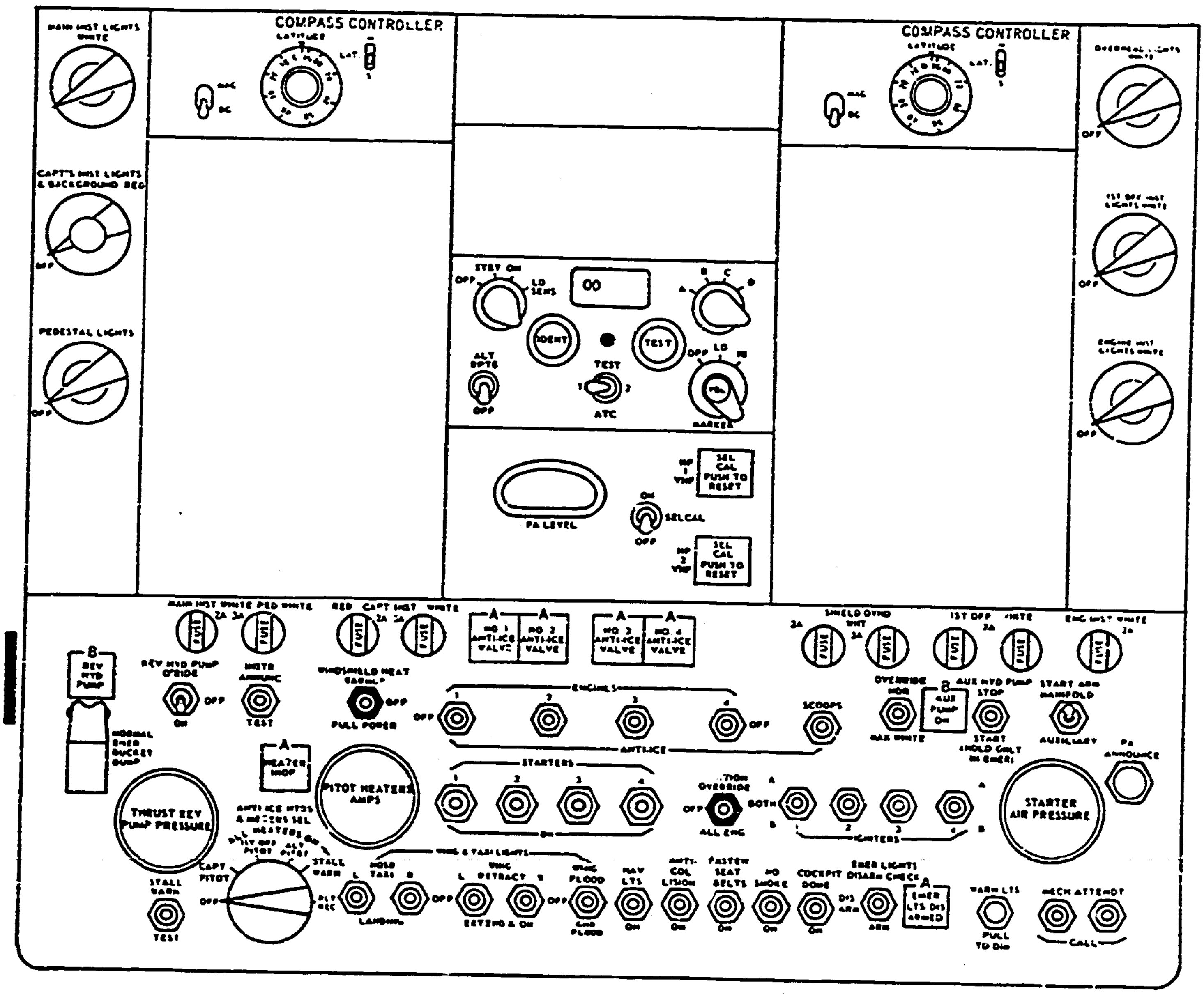
Overhead Switch Panel
Figure 1



A = AMBER INDICATING LIGHT
R = RED WARNING LIGHT
B = BLUE INDICATING LIGHT
= LEVER LOCK SWITCH

HA2-3700A

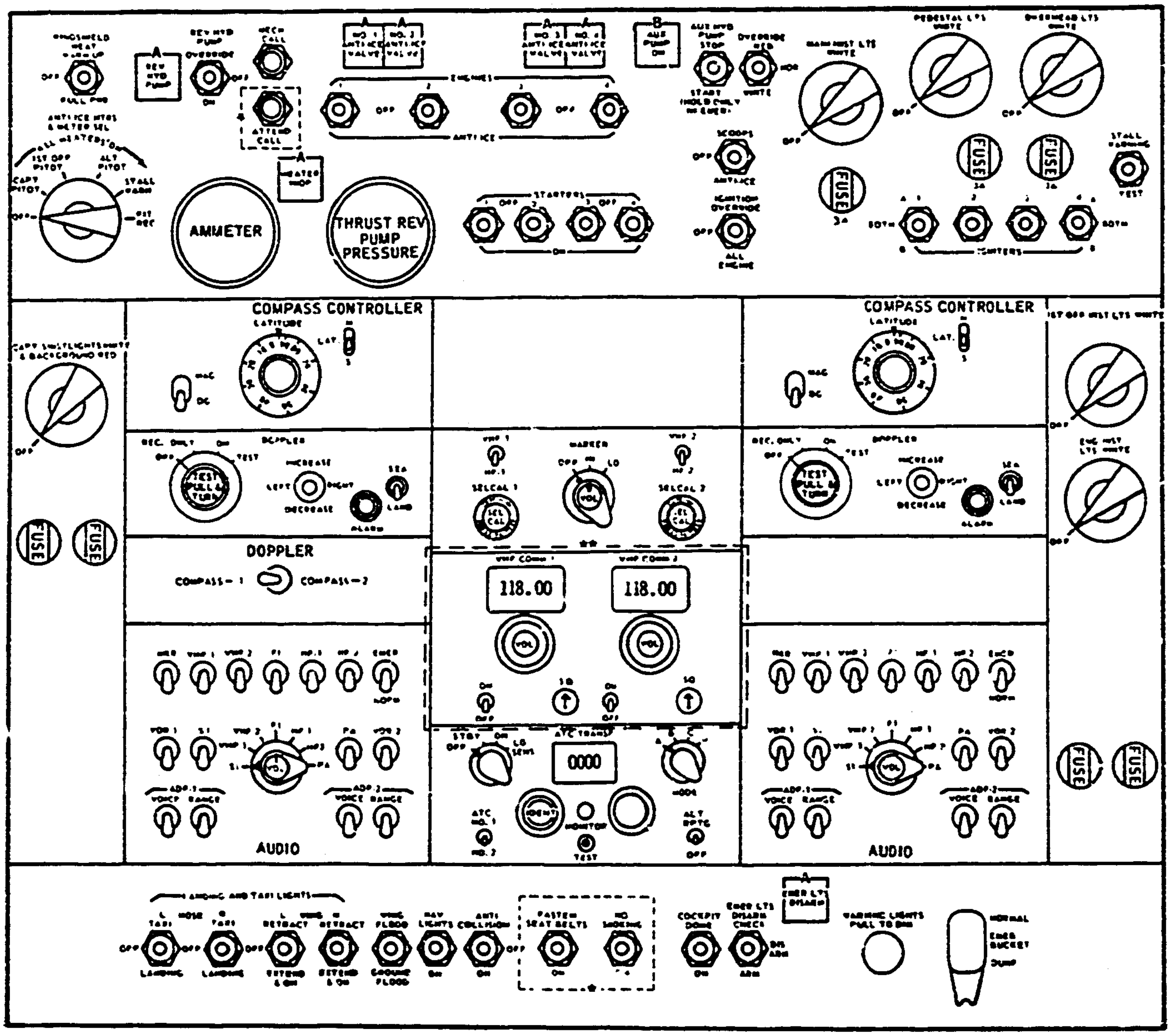
Overhead Switch Panel
Figure 1



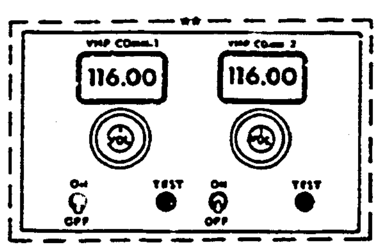
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
= LEVER LOCK SWITCH

HA2-3752C

Overhead Switch Panel
Figure 1



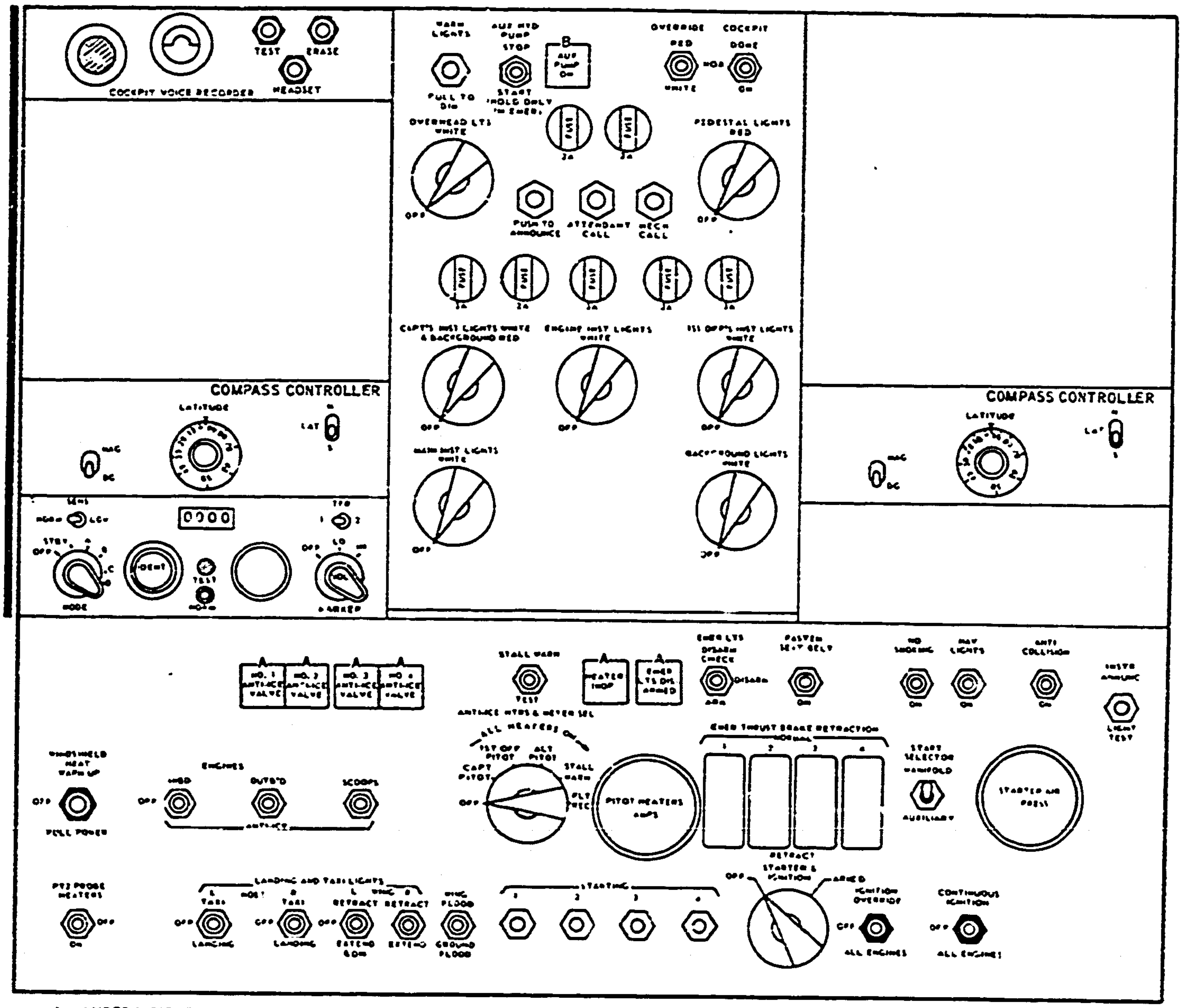
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
* NOT INSTALLED ON JA8036, JA8044, JA8054-JA8056



INSTALLED ON JA8044, JA8051-JA8053

HA2-41490

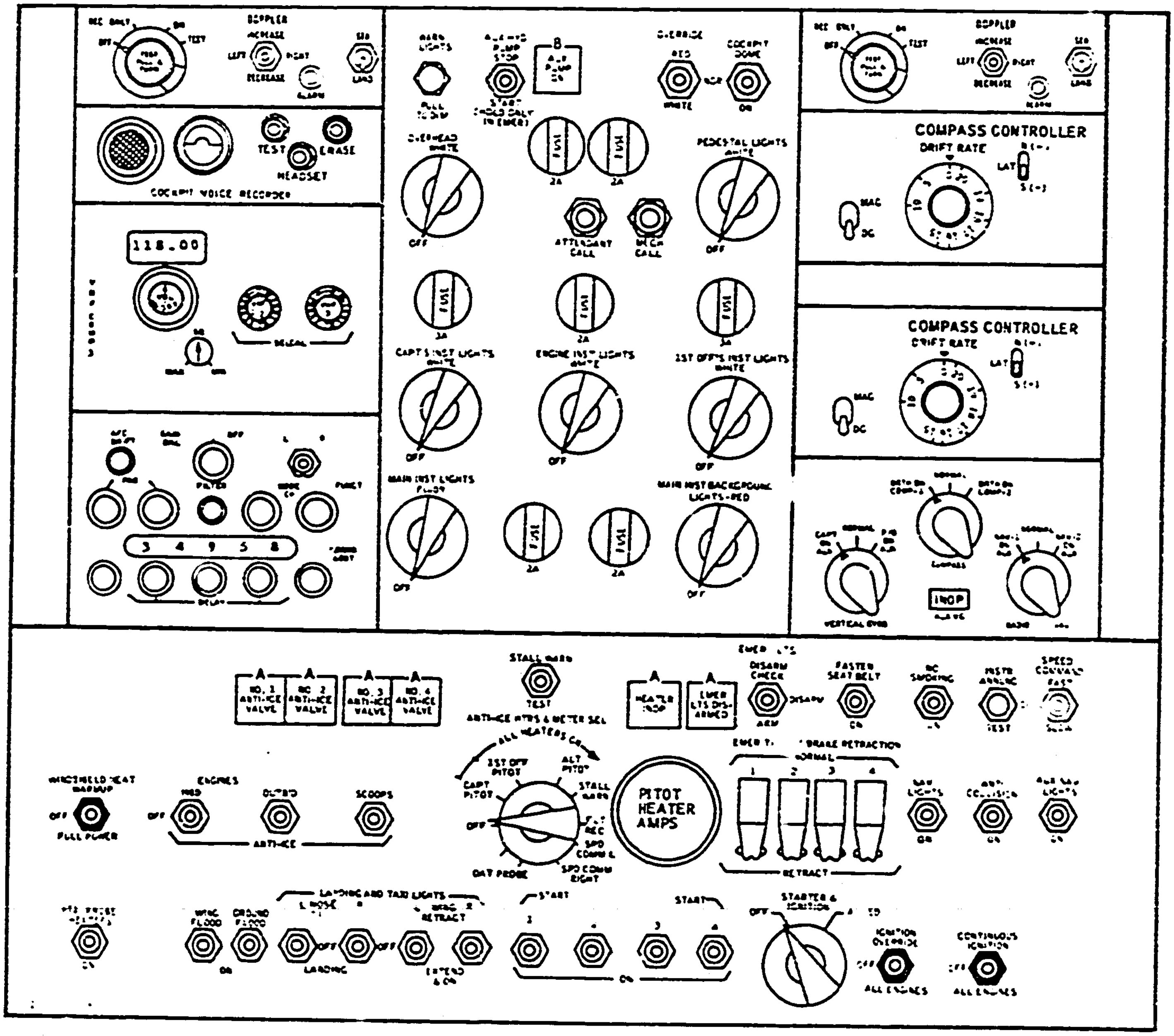
Overhead Switch Panel
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
= LEVER-LOCK SWITCH

HA2-3517

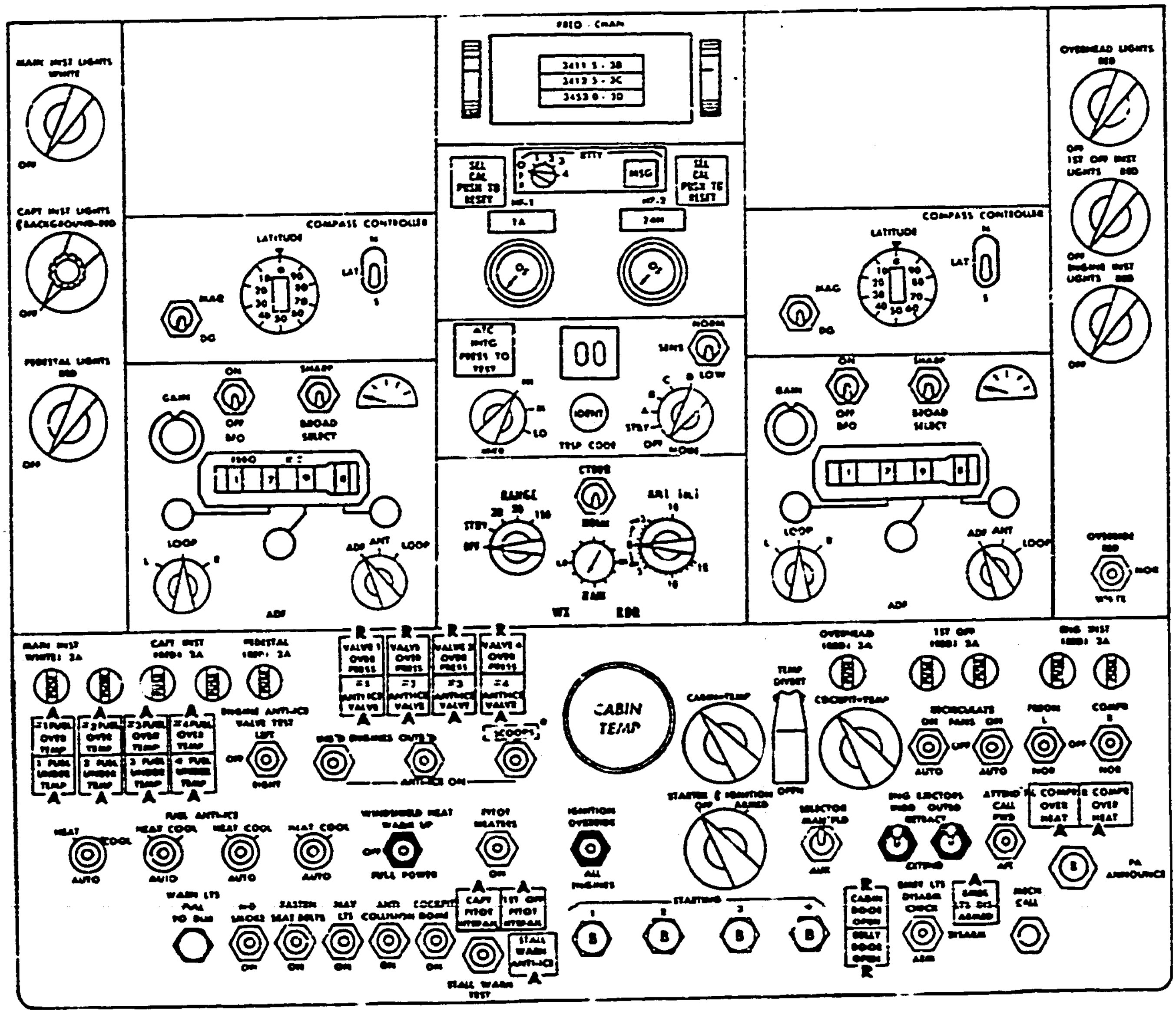
Overhead Switch Panel
Figure 1



A=AMBER INDICATING LIGHT
B=BLUE INDICATING LIGHT
=LEVER LOCK SWITCH

HA2-4432

Overhead Switch Panel
Figure 1

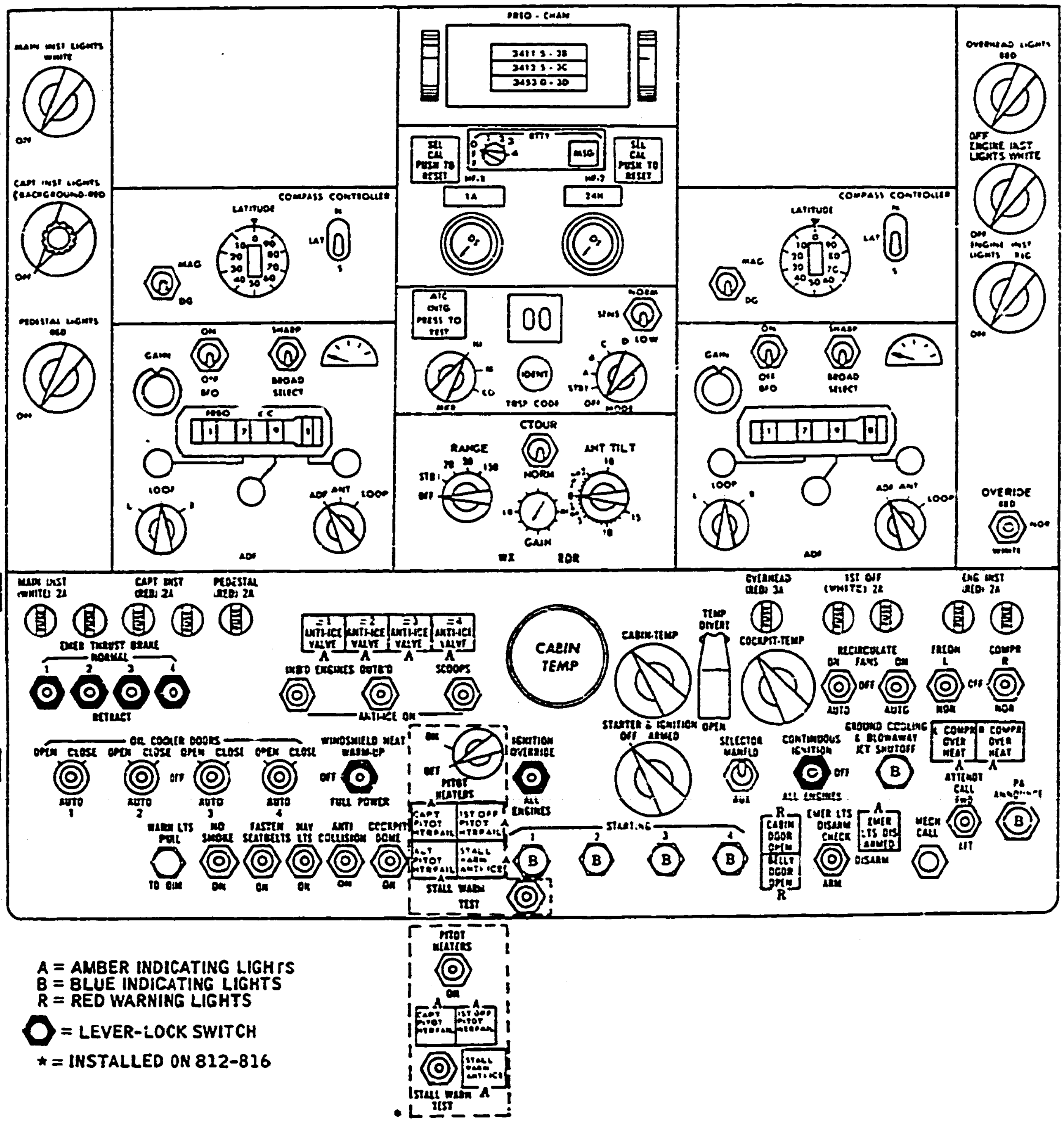


A = AMBER INDICATING LIGHTS
B = BLUE INDICATING LIGHTS
R = RED WARNING LIGHTS
= LEVER-LOCK SWITCH

NOTE:
*"SCOOPS" ONLY FOR AIRPLANES
FLEET NOS. 805-810

H1-178

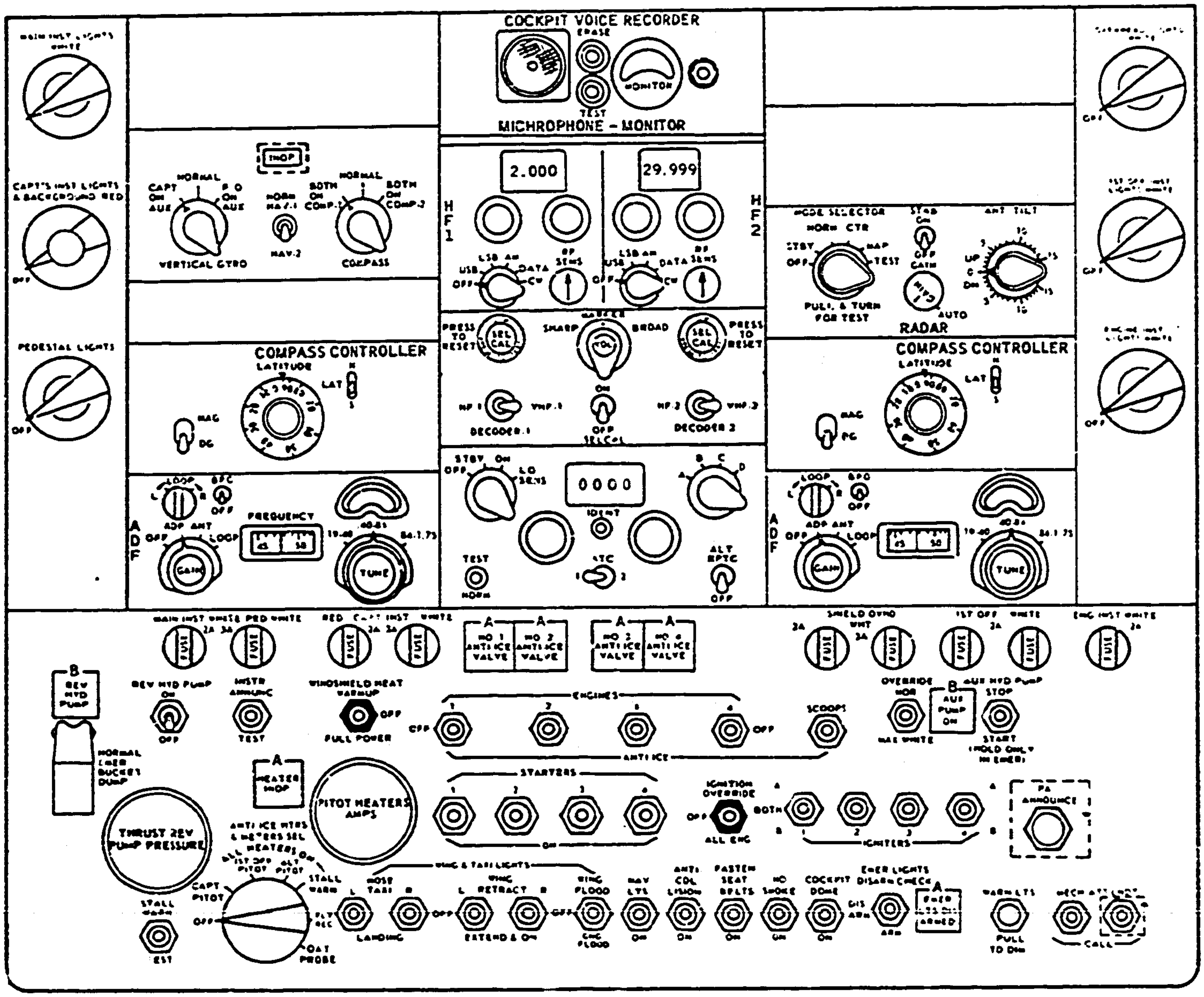
Overhead Switch Panel
Figure 1



A = AMBER INDICATING LIGHTS
B = BLUE INDICATING LIGHTS
R = RED WARNING LIGHTS
⬡ = LEVER-LOCK SWITCH
* = INSTALLED ON 812-816

H2-5341E

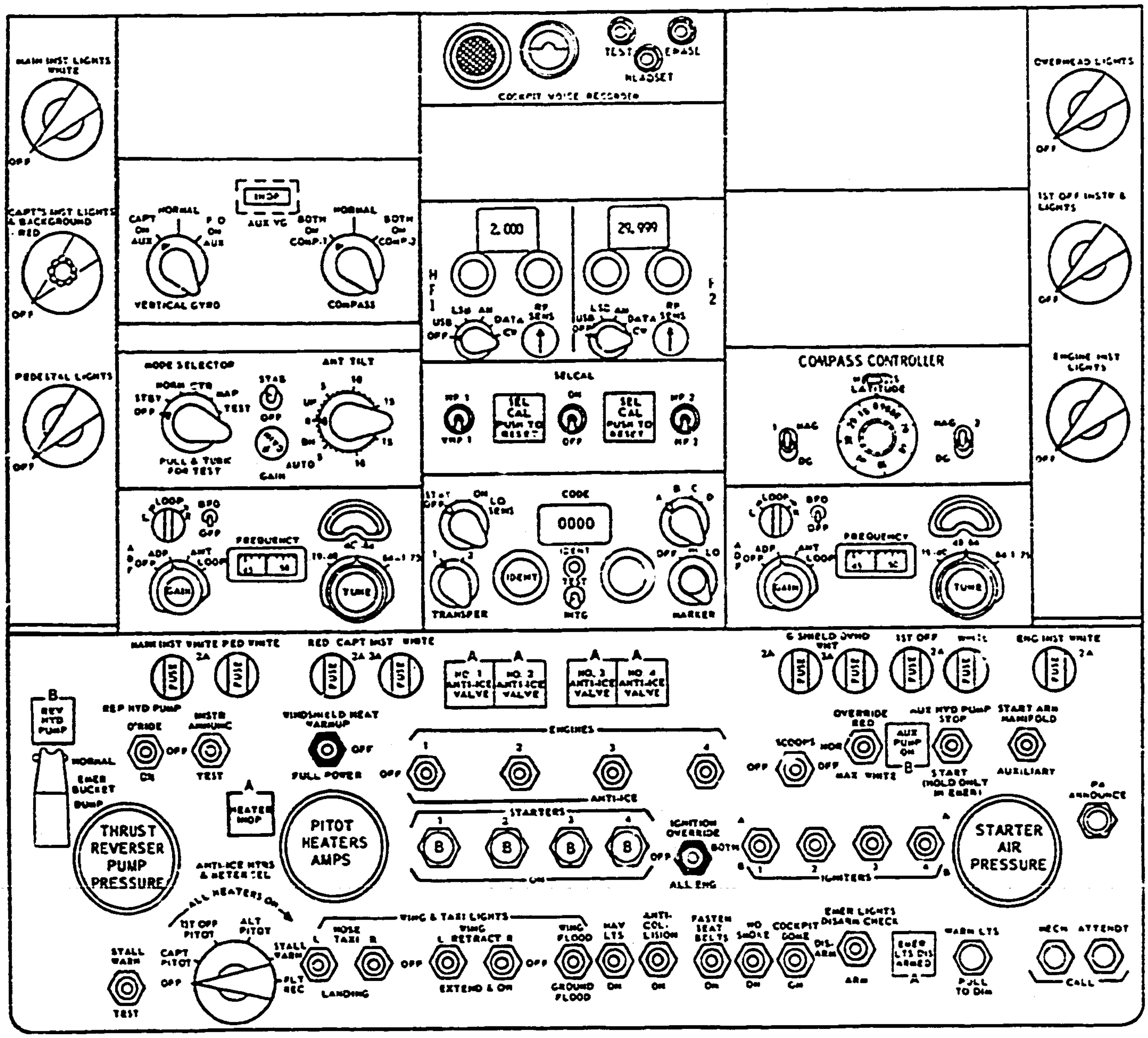
Overhead Switch Panel
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
= LEVER-LOCK SWITCH
* INSTALLED ON N779FT AND SUBSEQUENT

HA2-48398

Overhead Switch Panel
Figure 1

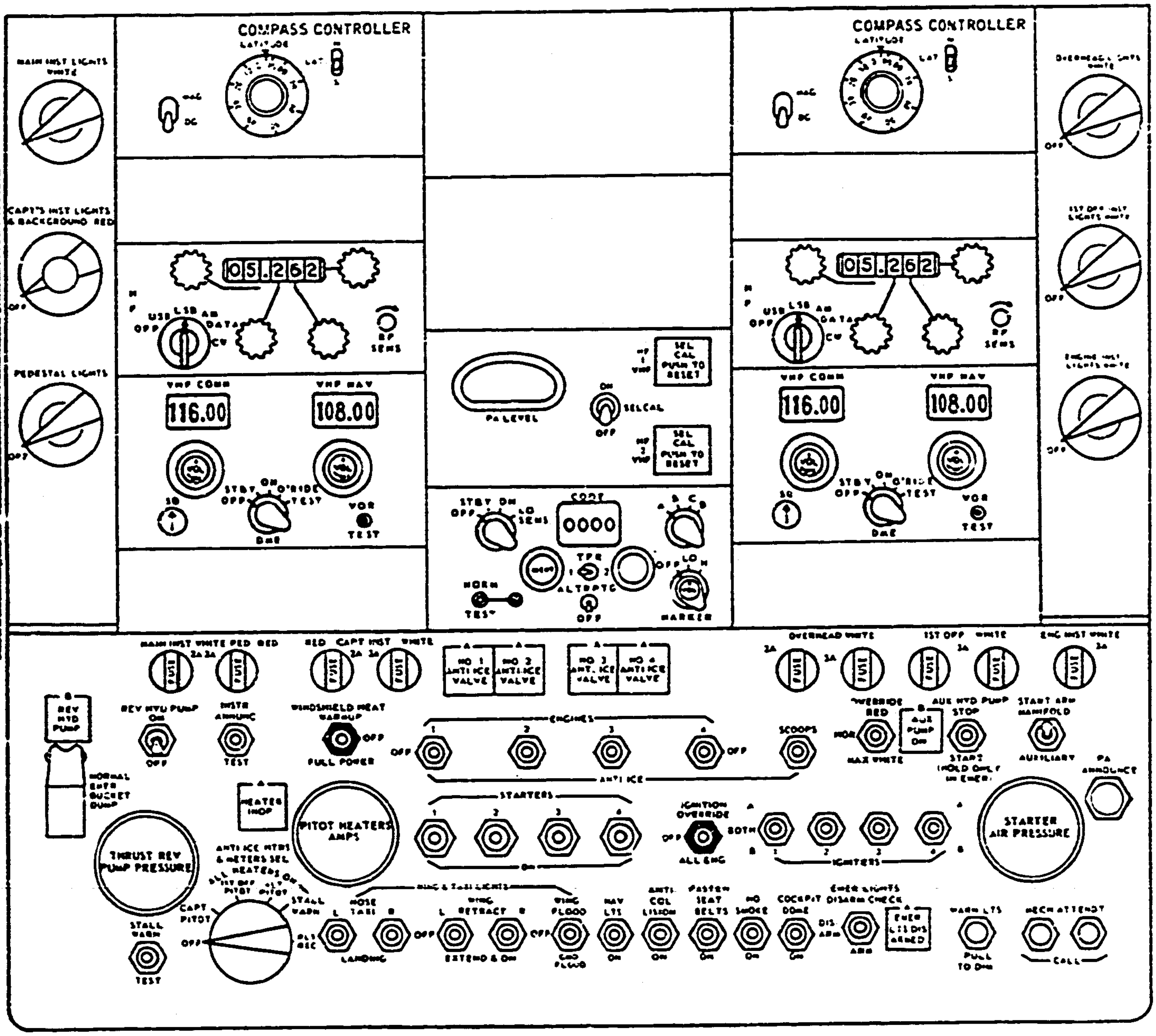


A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
⬡ = LEVER-LOCK SWITCH

HA2-4841A

Overhead Switch Panel
Figure 1

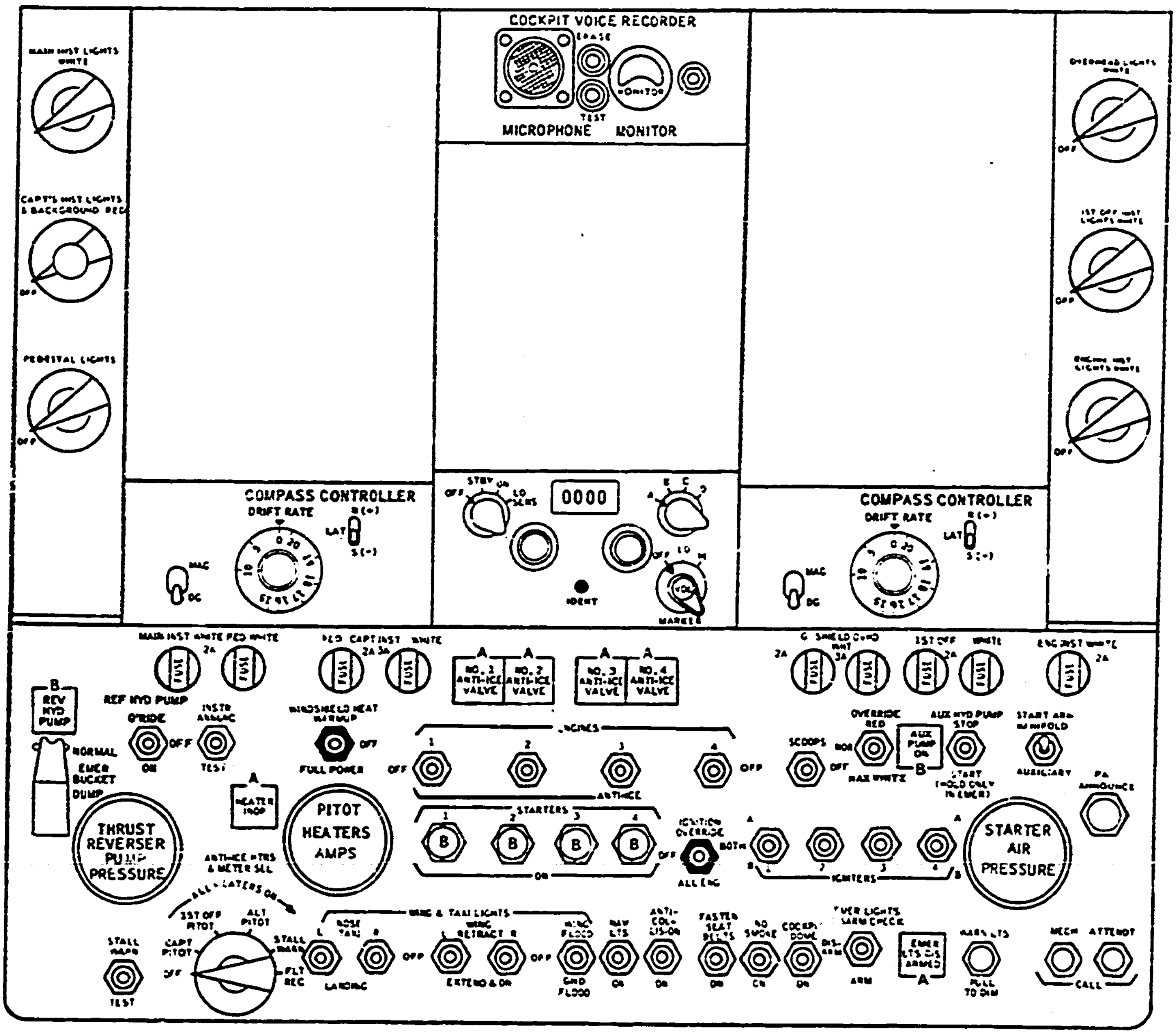
Printed in U.S.A.



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
(symbol) = LEVER-LOCK SWITCH

HA2-4840A

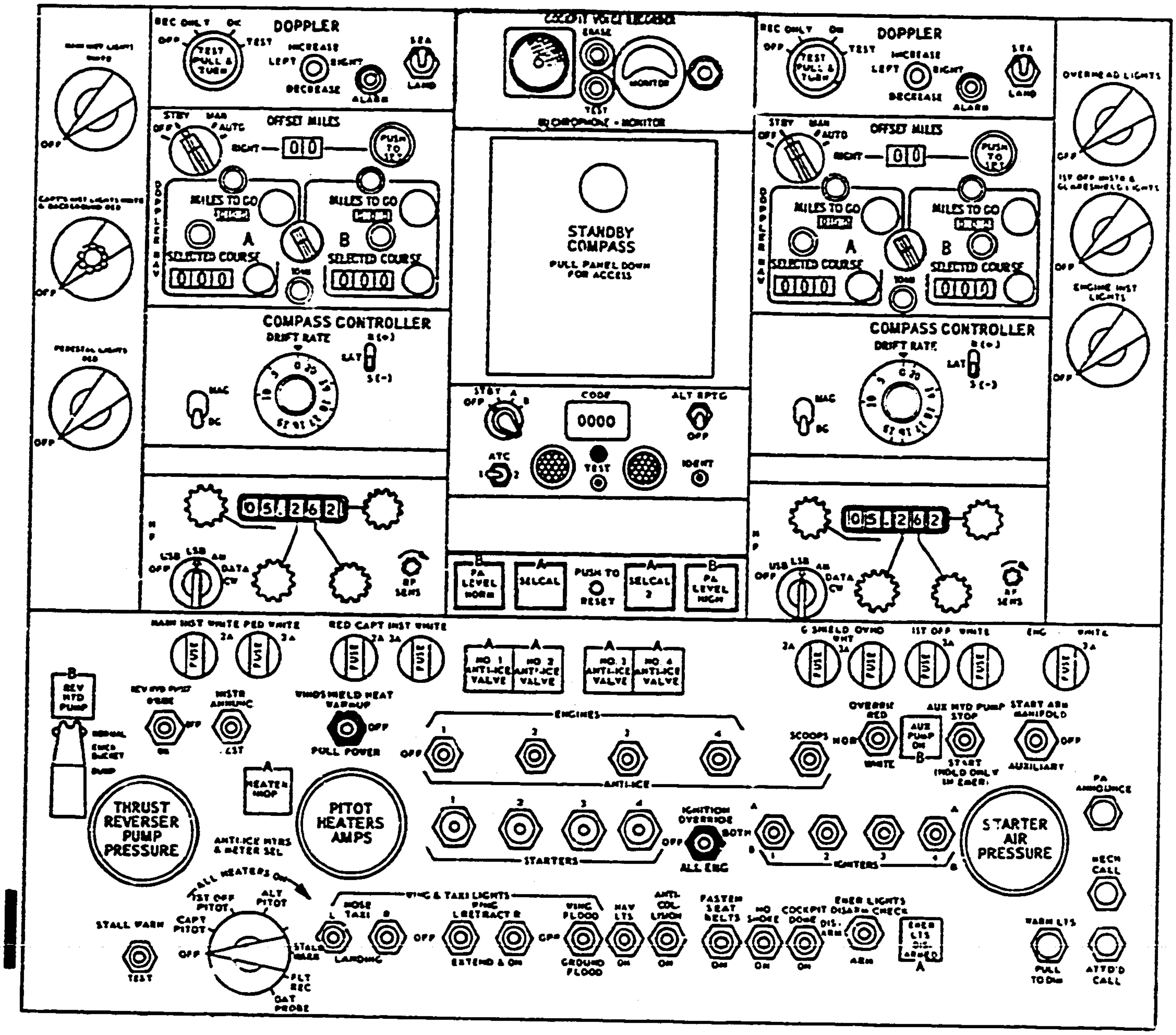
Overhead Switch Panel
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
= LEVER-LOCK SWITCH

HA2-4751

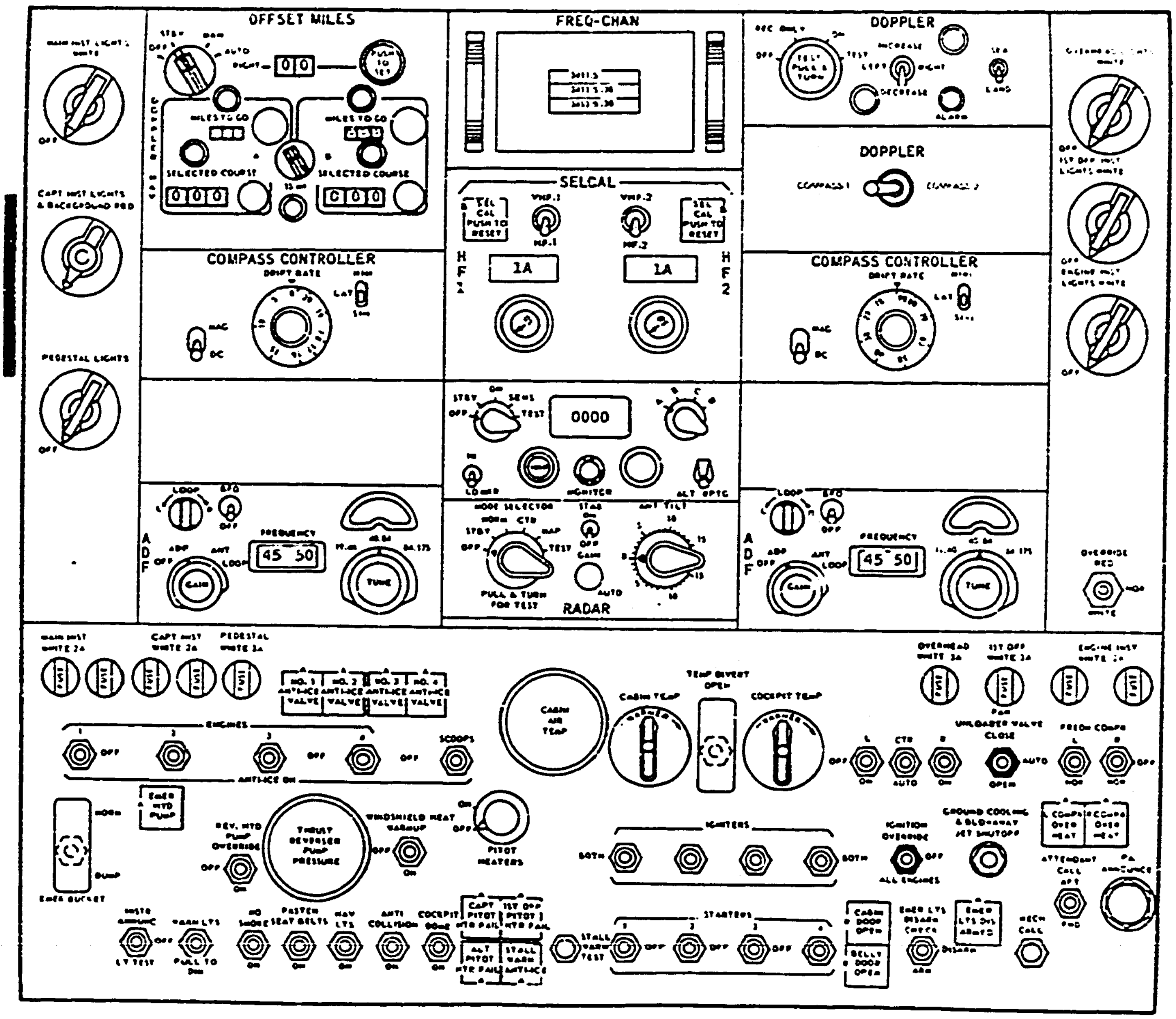
Overhead Switch Panel
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
= LEVER-LOCK SWITCH

HA2-4457B

Overhead Switch Panel
Figure 1

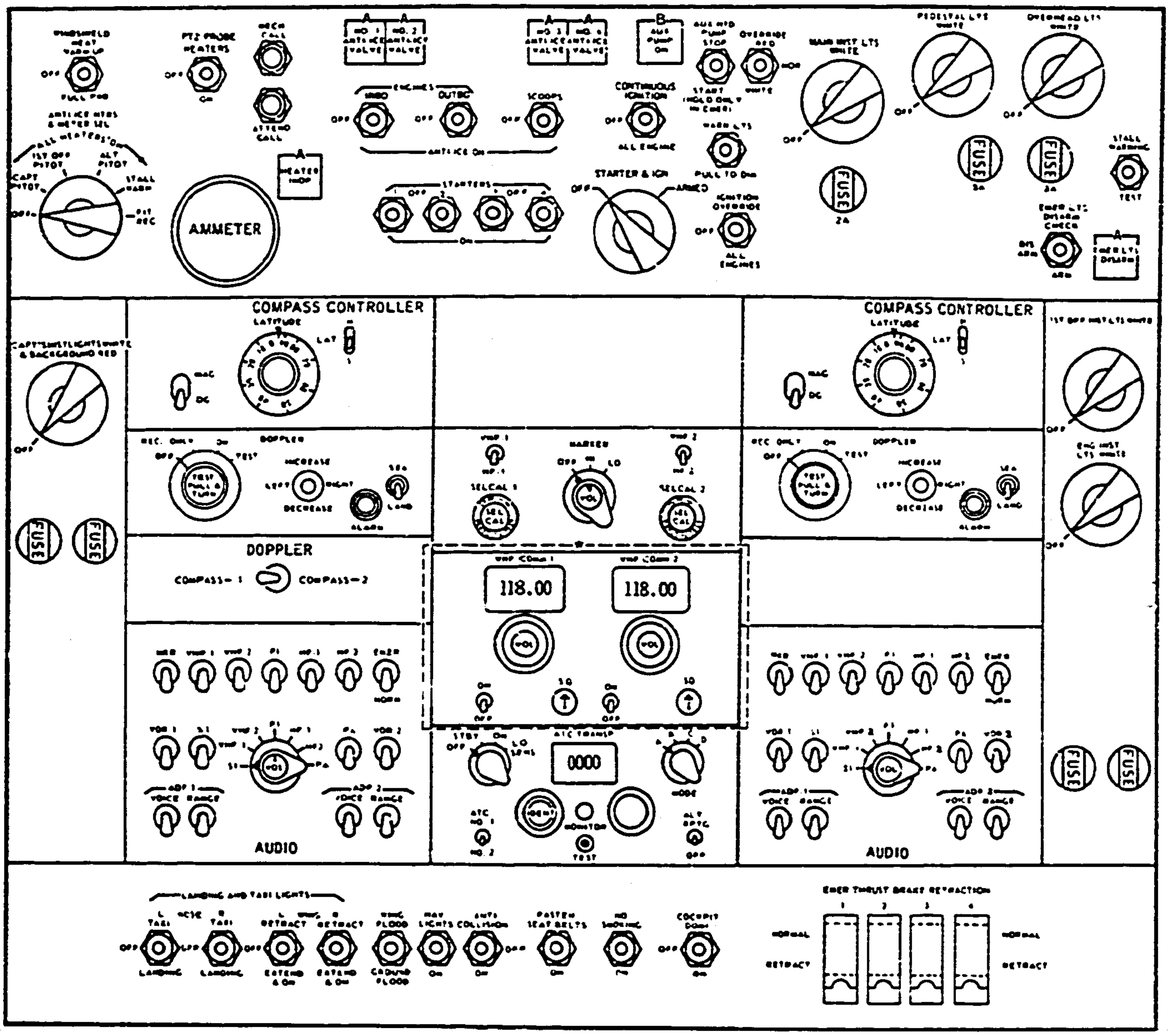


A - AMBER INDICATING LIGHT
B - BLUE INDICATING LIGHT
R - RED WARNING LIGHT

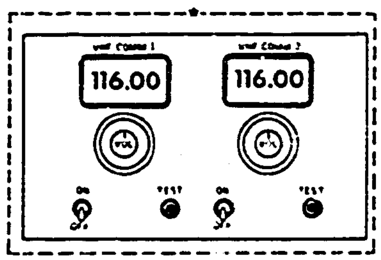
 LEVER LOCK SWITCH

HA2-5504A

Overhead Switch Panel
Figure 1



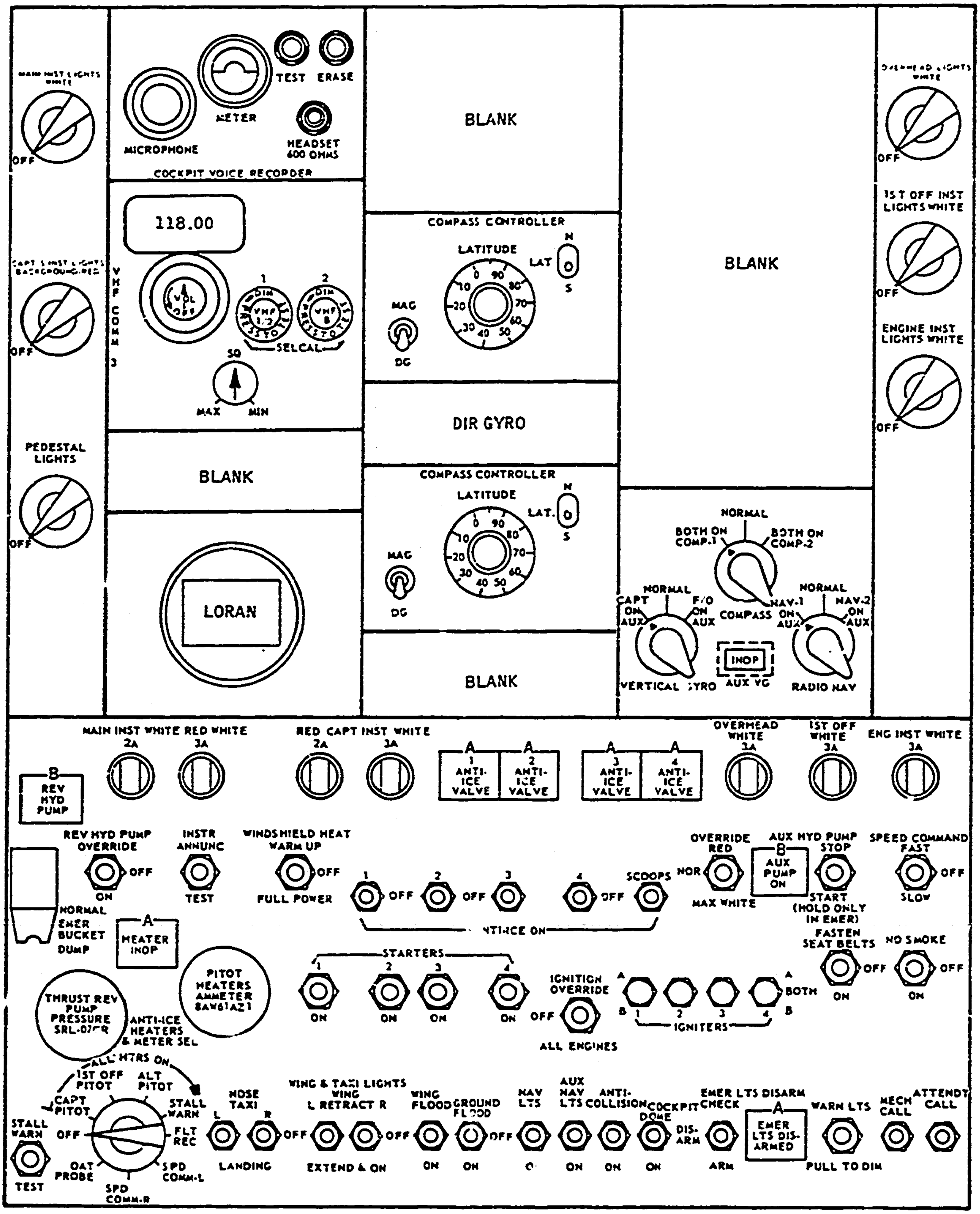
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT



INSTALLED ON JA8041-JA8043, JA8045 AND SUBS

HA2-5618C

Overhead Switch Panel
Figure 1

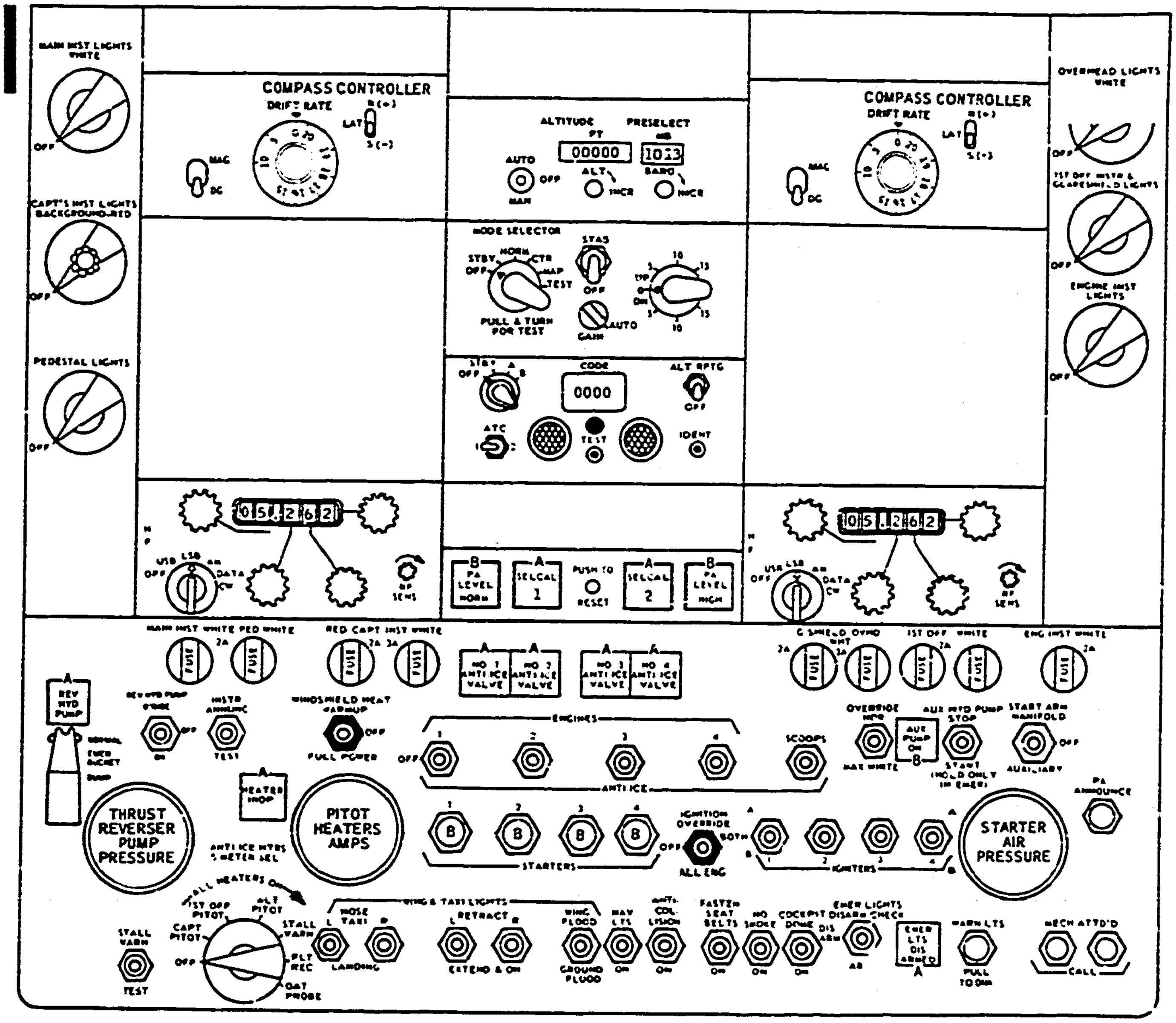


A=AMBER INDICATING LIGHT
B=BLUE INDICATING LIGHT
◎ =LEVER LOCK SWITCHES

HA2-5605

Overhead Switch Panel
Figure 1

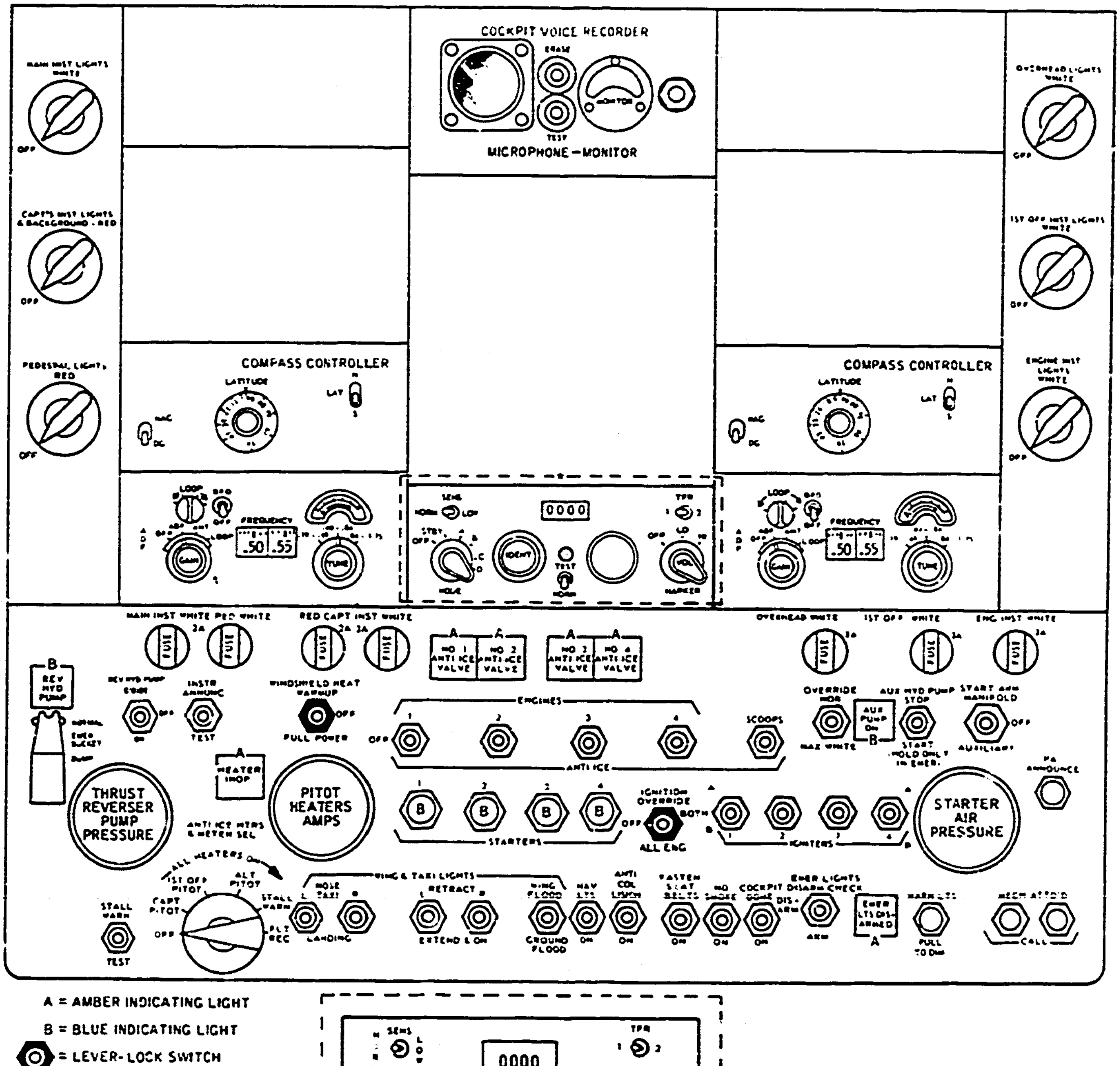
Printed in U.S.A.

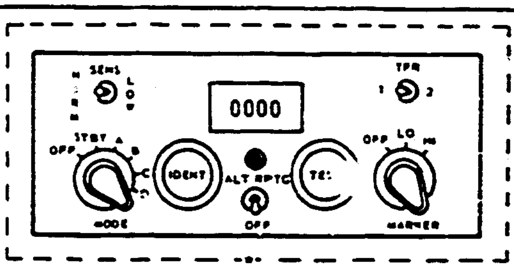


A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
(hexagon symbol) = LEVER-LOCK SWITCH

HA2-5611A

Overhead Switch Panel
Figure 1

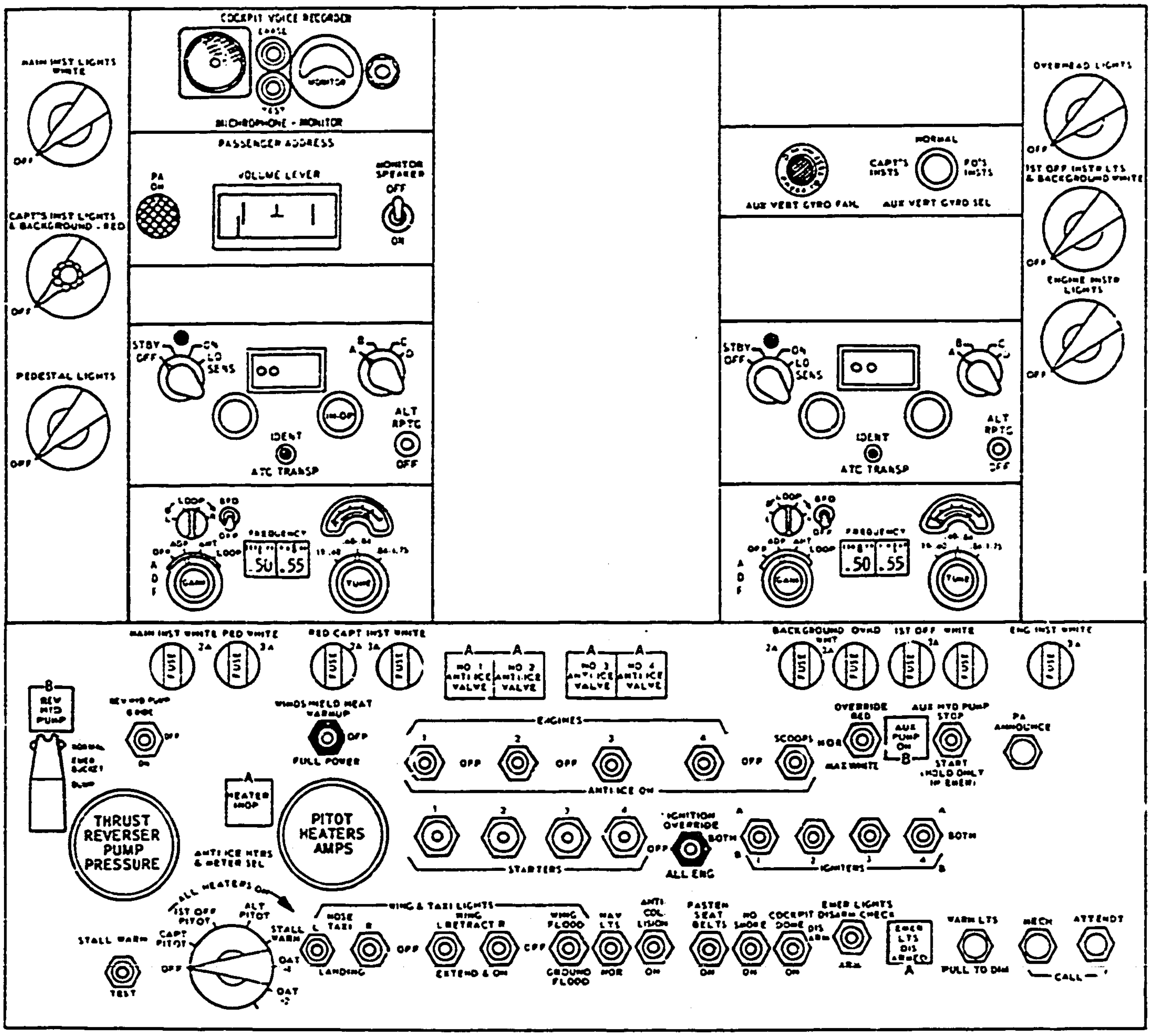




INSTALLED ON N4864T AND SUBSEQUENT

HA2-5774C

Overhead Switch Panel
Figure 1



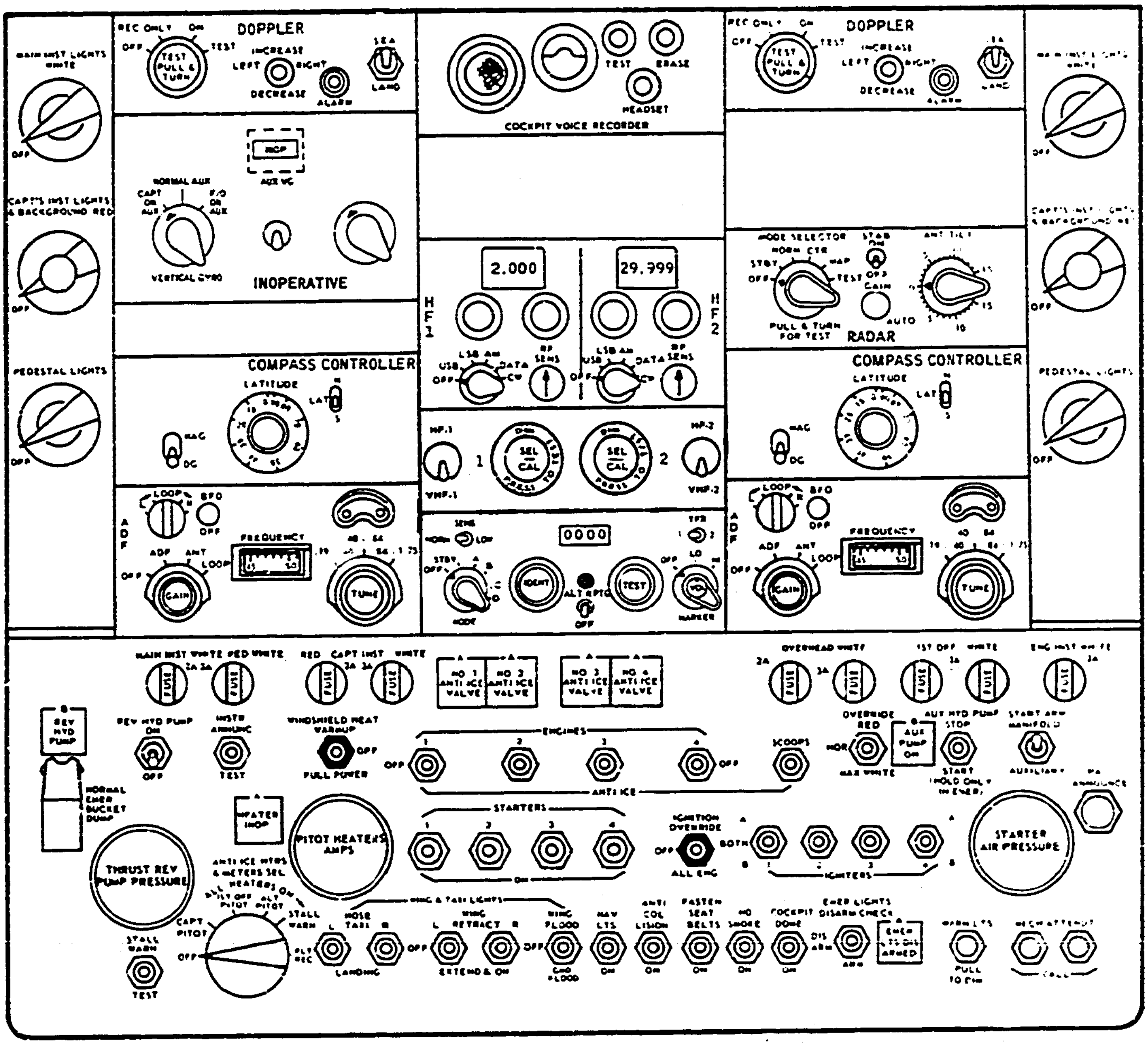
A = AMBER INDICATING LIGHT

B = BLUE INDICATING LIGHT

(hexagon symbol) = LEVER-LOCK SWITCH

HA2-6052

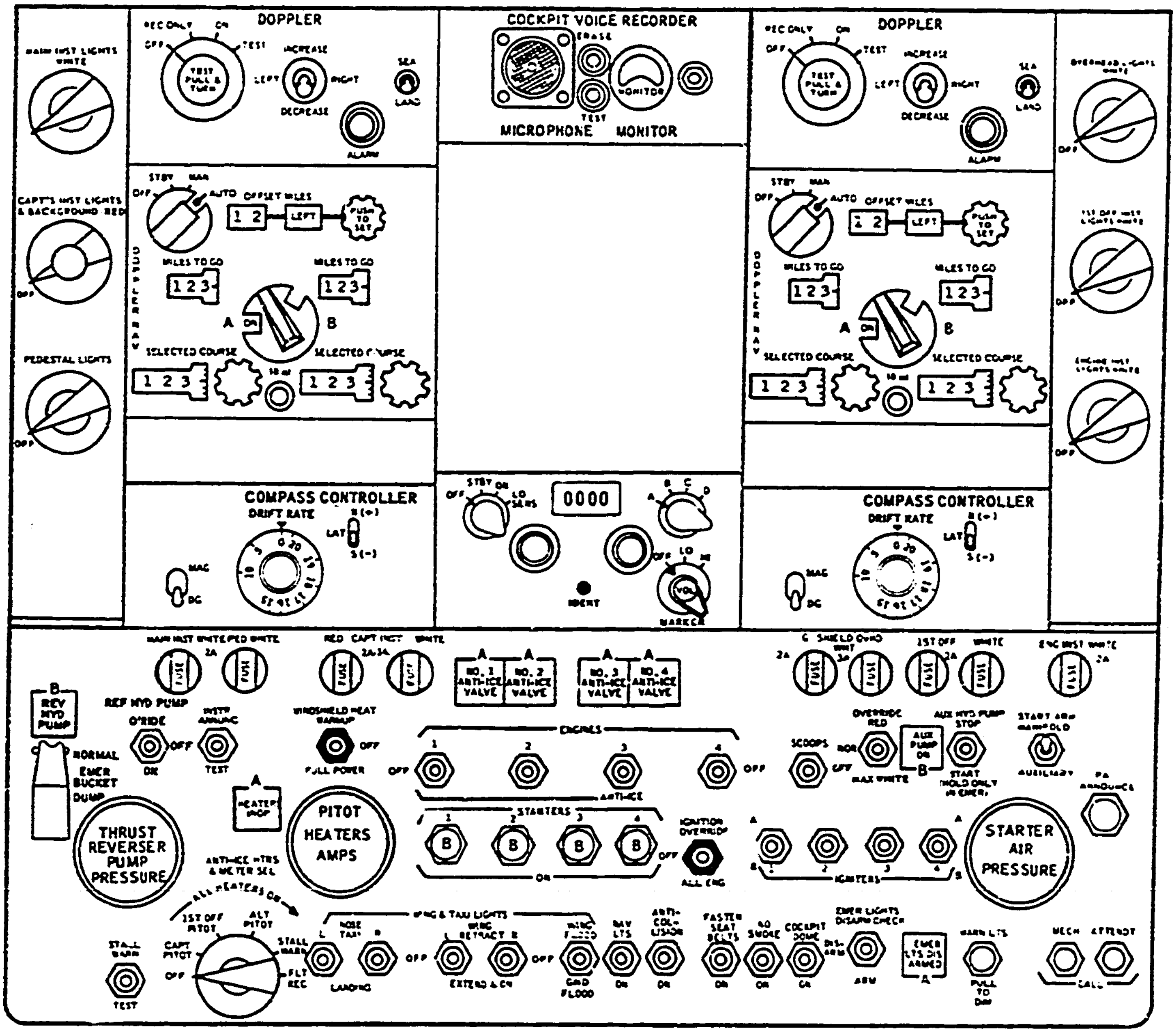
Overhead Switch Panel
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
= LEVER-LOCK SWITCH

HA2-6431A

Overhead Switch Panel
Figure 1

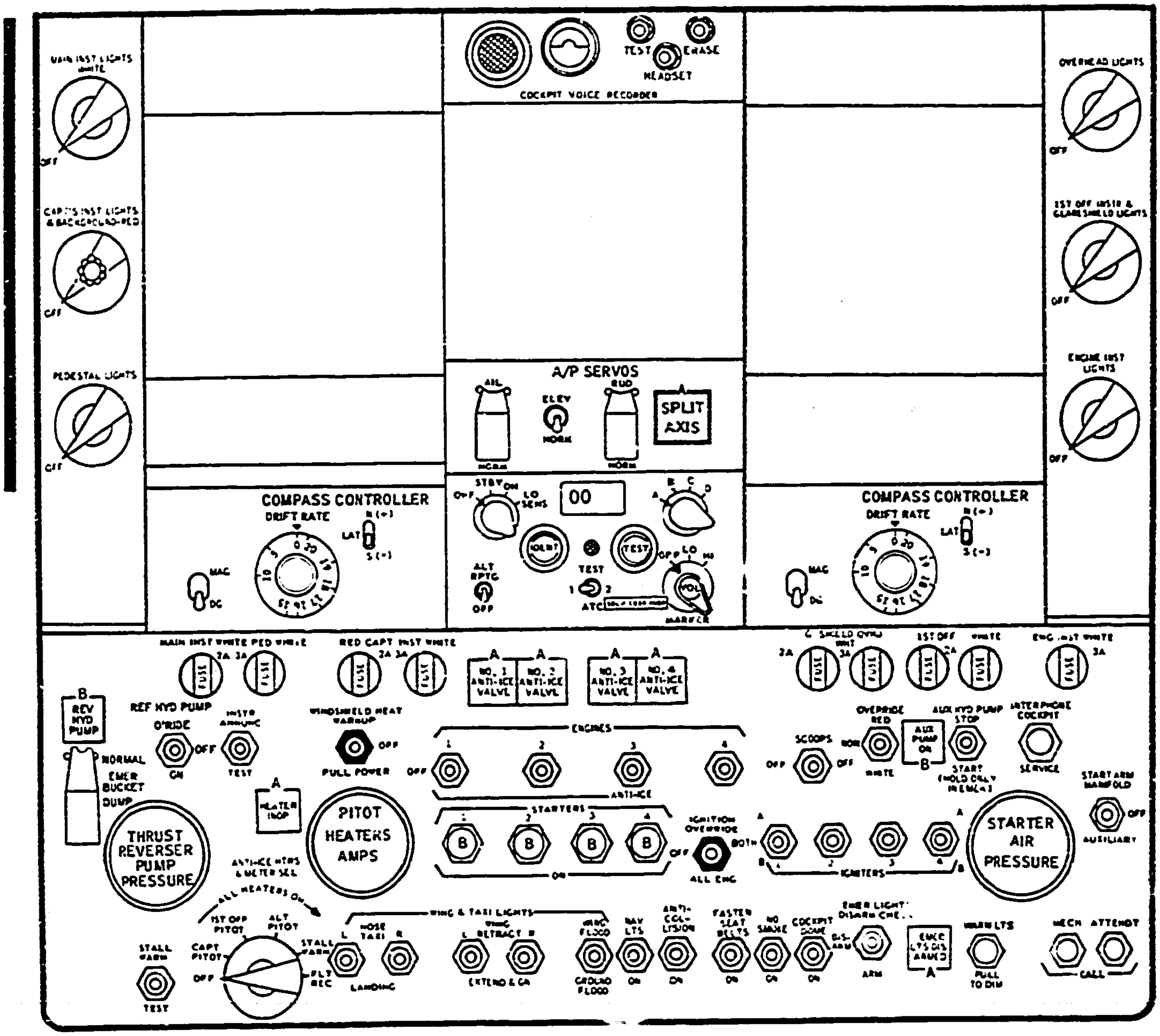


A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
= LEVER-LOCK SWITCH

HA2-6464

Overhead Switch Panel
Figure 1

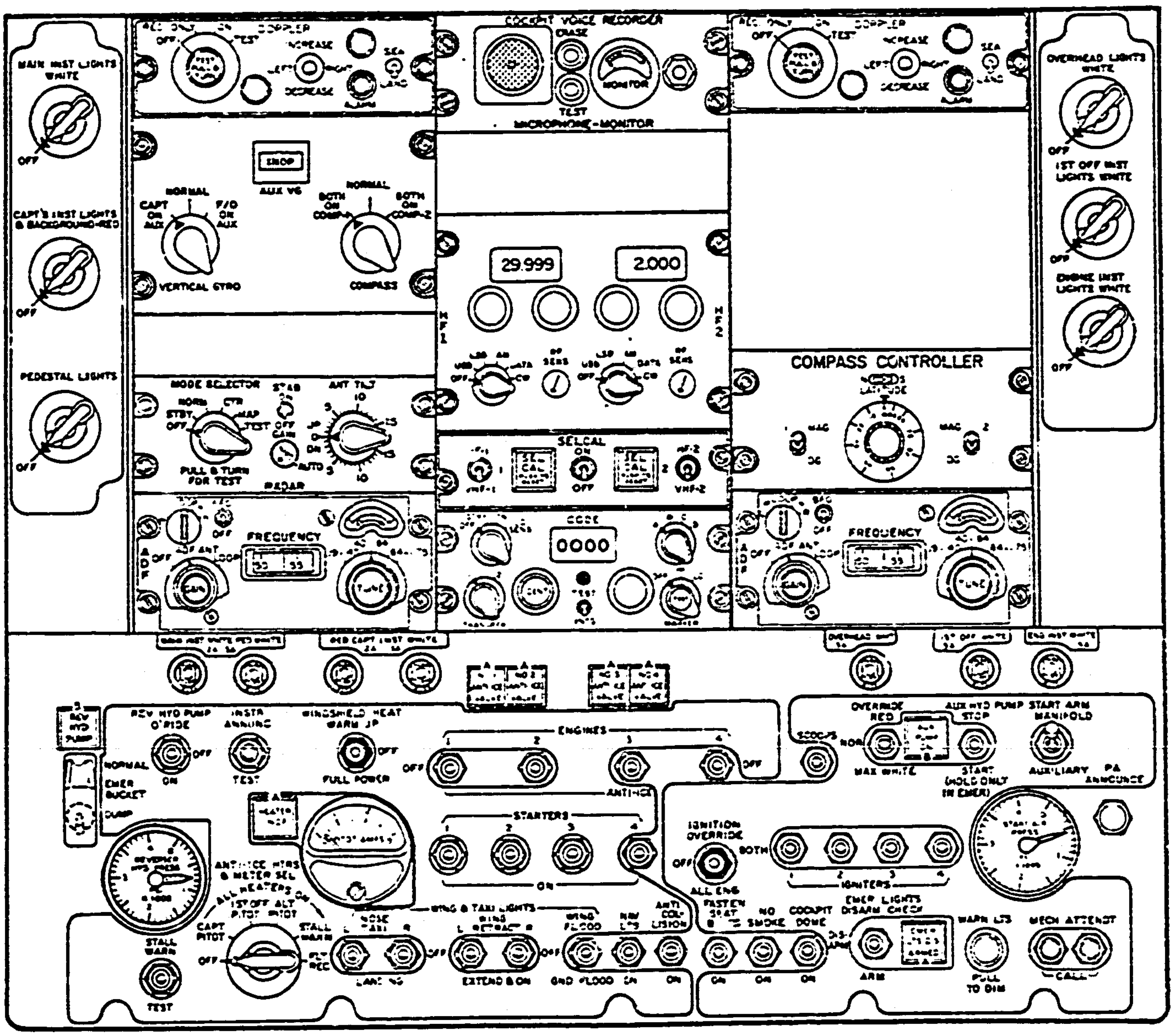
Printed in U.S.A.



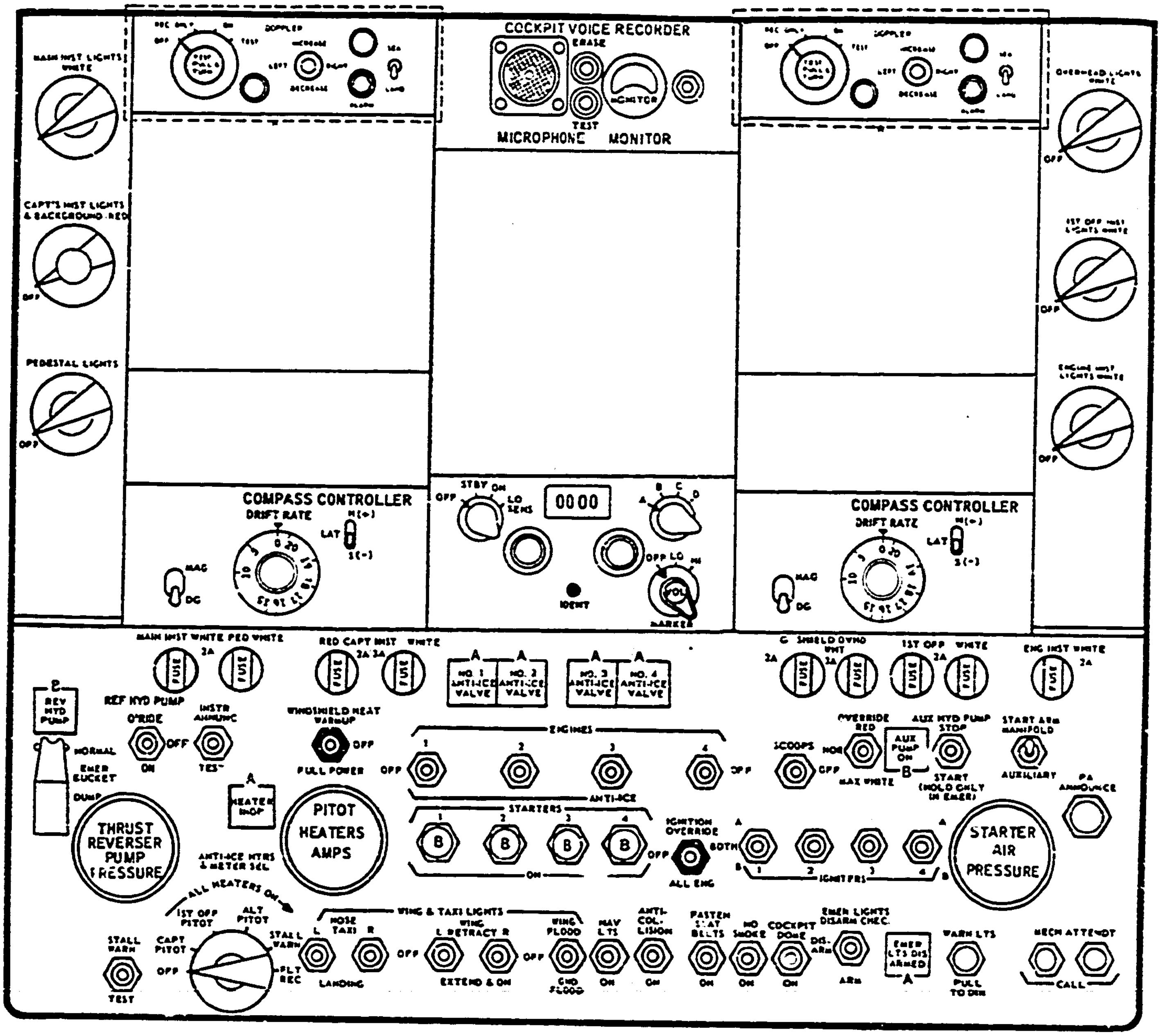
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
= LEVER LOCK SWITCH

Overhead Switch Panel
Figure 1

A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
◎ = LEVER-LOCK SWITCH



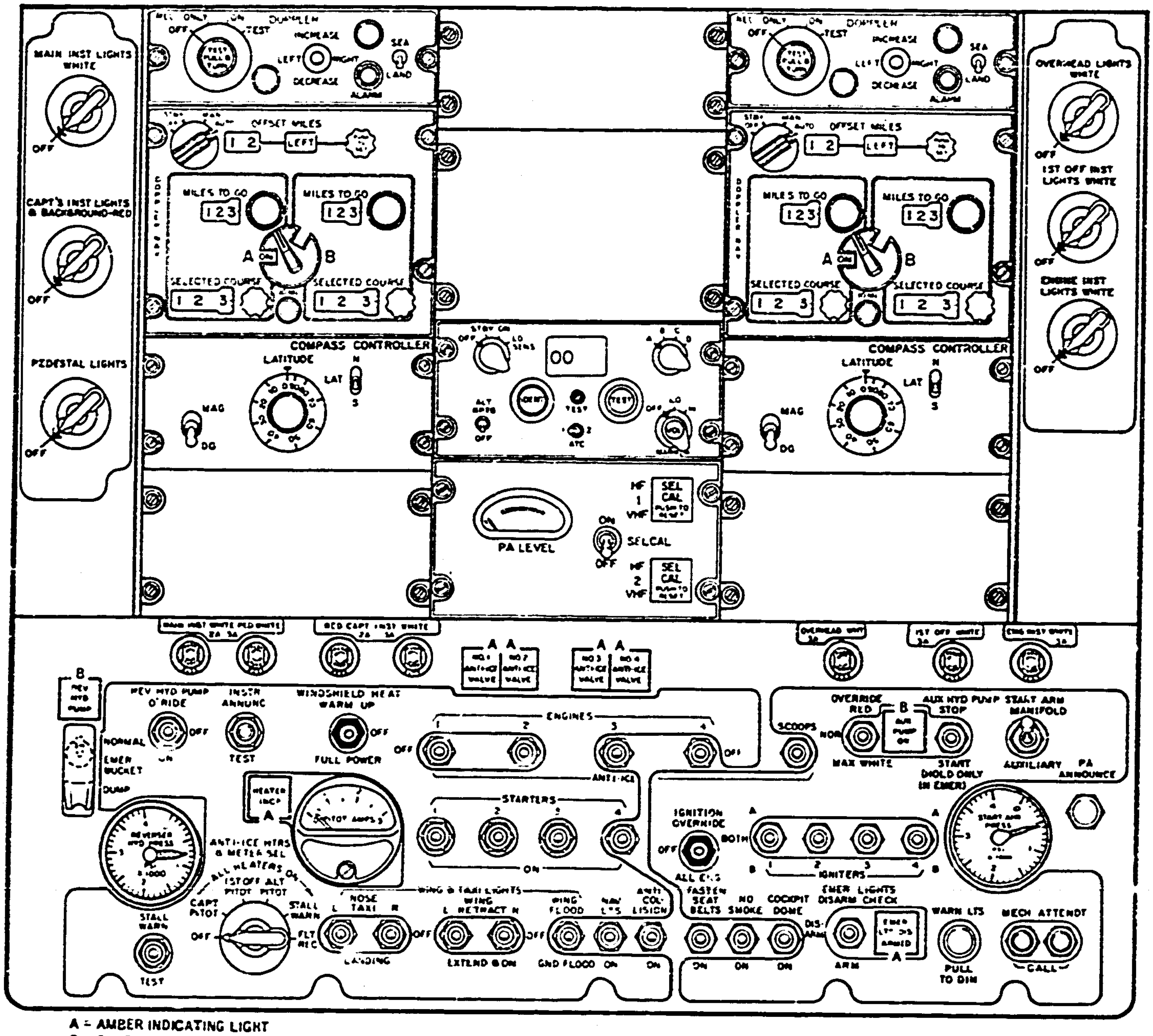
Overhead Switch Panel
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
(symbol) = LEVER-LOCK SWITCH
* NOT INSTALLED ON N863F.

HA2-7083

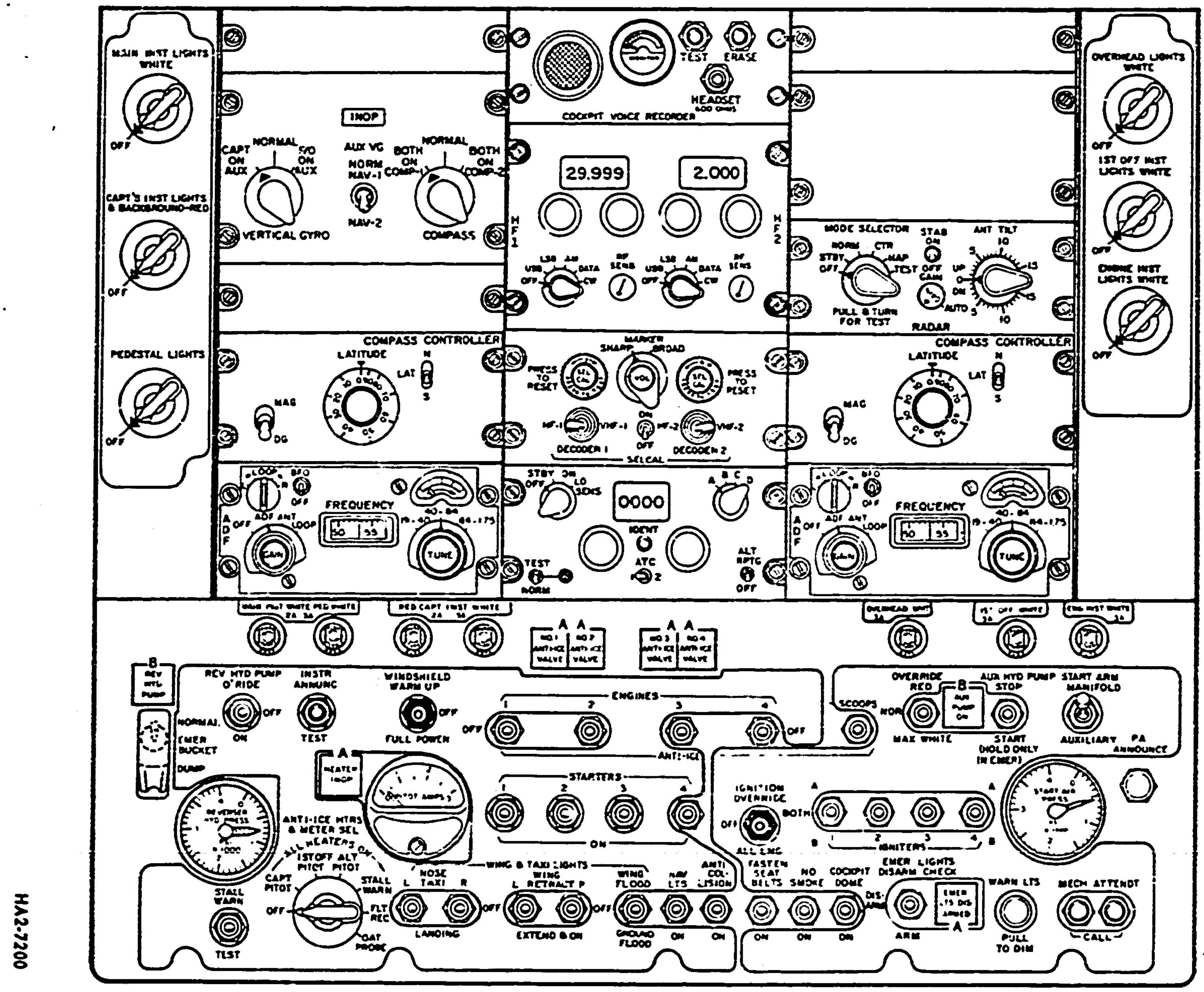
Overhead Switch Panel
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
⊙ = LOCK-LEVER SWITCH

HA2-7185

Overhead Switch Panel
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
◎ = LOCK-LEVER SWITCH

Overhead Switch Panel
Figure 1

OVERHEAD SWITCH PANEL - MAINTENANCE PRACTICES

1. General

A. Only the individual switch panels can be removed from the overhead switch panel. In order to remove the switch panels, it is necessary to remove all power from the airplane and to disconnect all electrical wires from the switch panels.

B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Overhead Switch Panel

A. Remove Switch Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

(2) Manually support panel and loosen quick-release fasteners.

(3) Lift panel out a few inches, and disconnect and tag electrical wires.

(4) Remove panel.

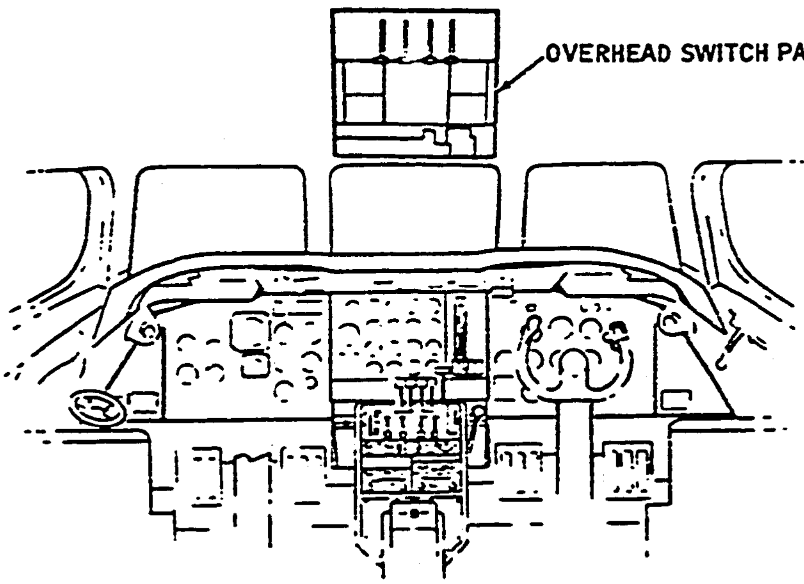
B. Install Overhead Switch Panel

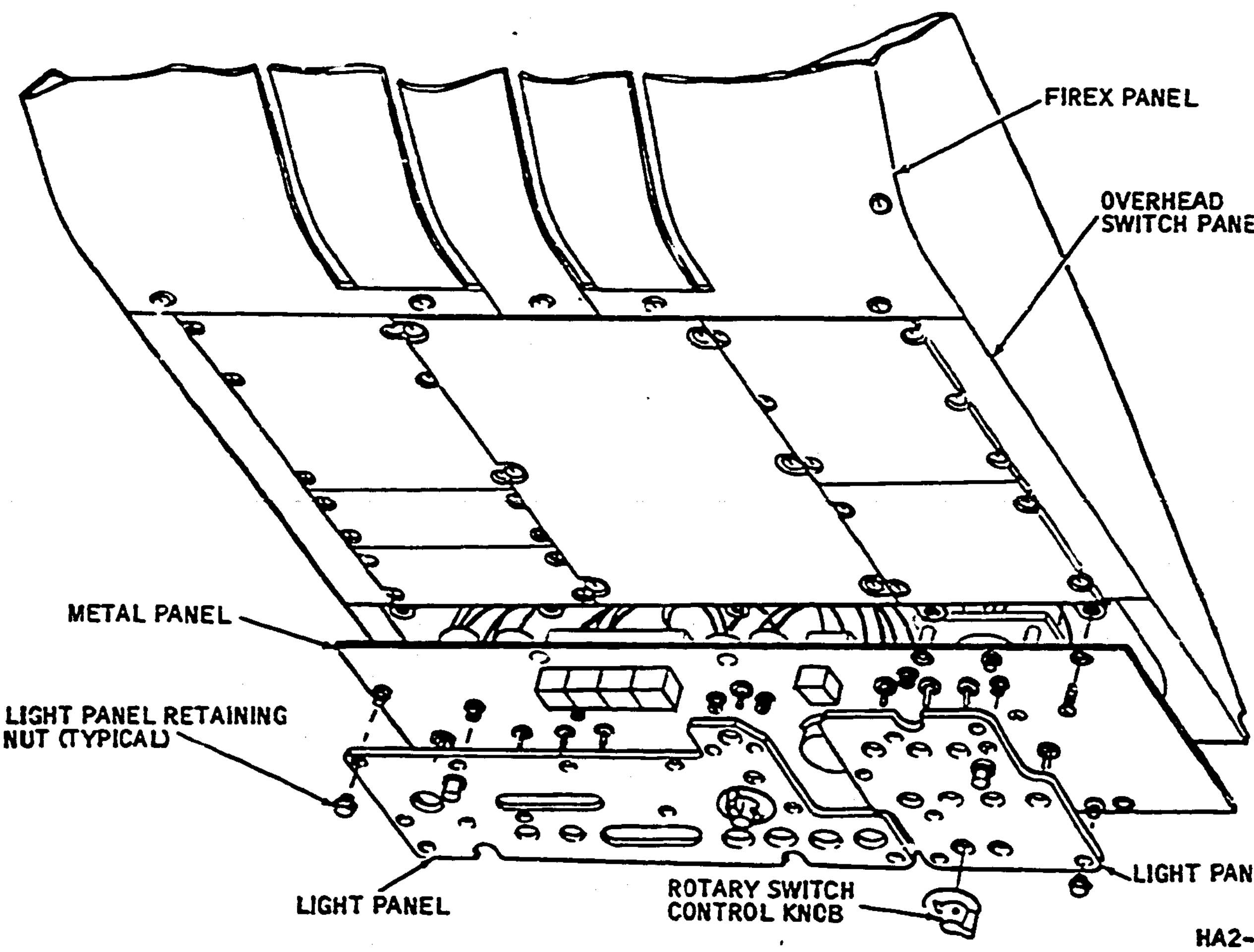
(1) Verify power is removed from airplane.

(2) Place panel in cavity and connect electrical wires.

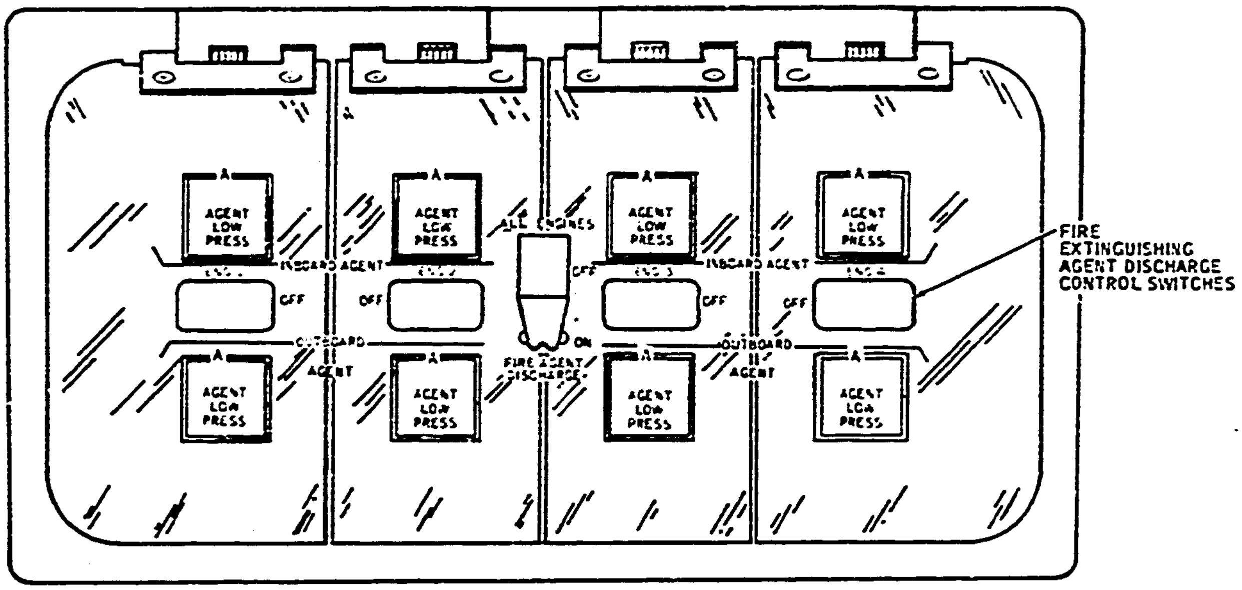
(3) Secure panel in cavity with quick-release fasteners around perimeter.

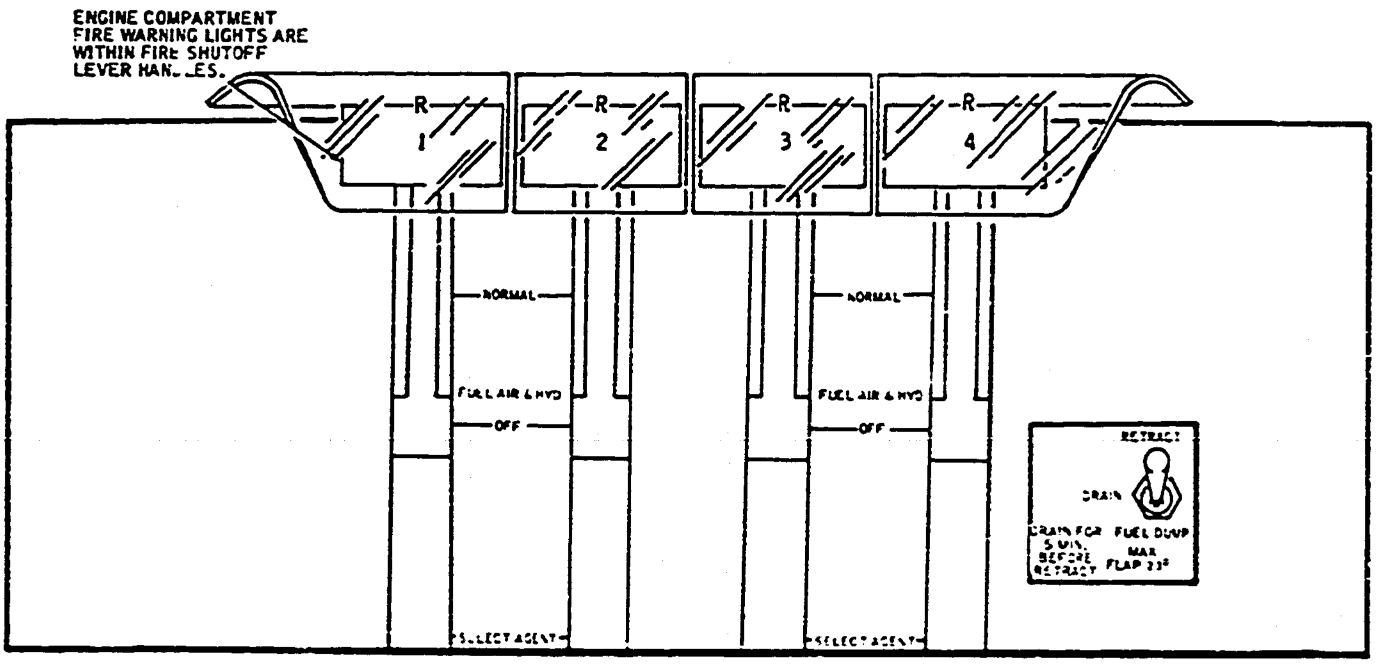
(4) Perform operational test of all systems involved to determine integrity of new installation.





Overhead Switch Panel Maintenance
Figure 201

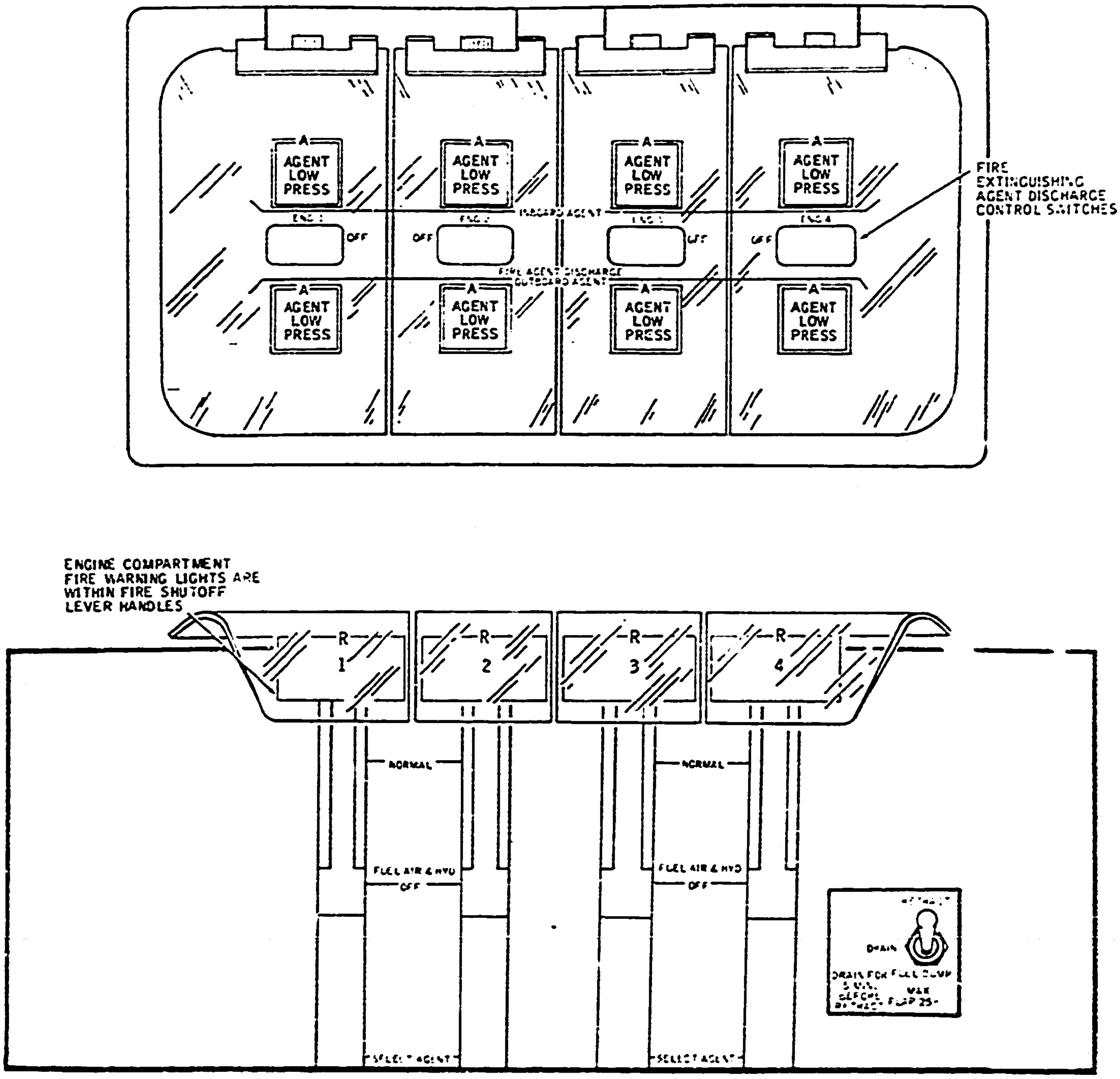




A= AMBER INDICATING LIGHT
R= RED WARNING LIGHT

HA2-12138

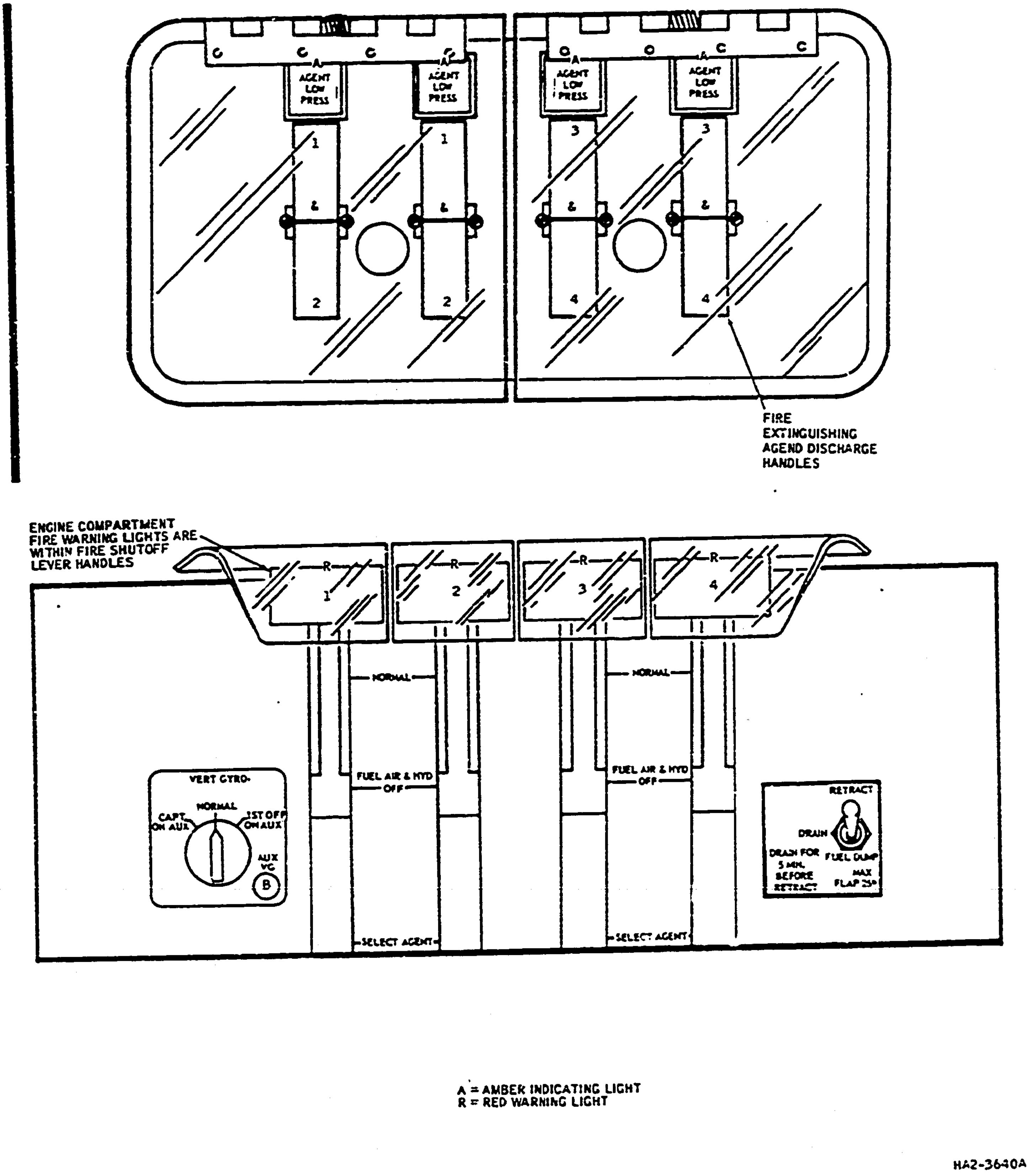
Fire Extinguishing System Panel
Figure 1



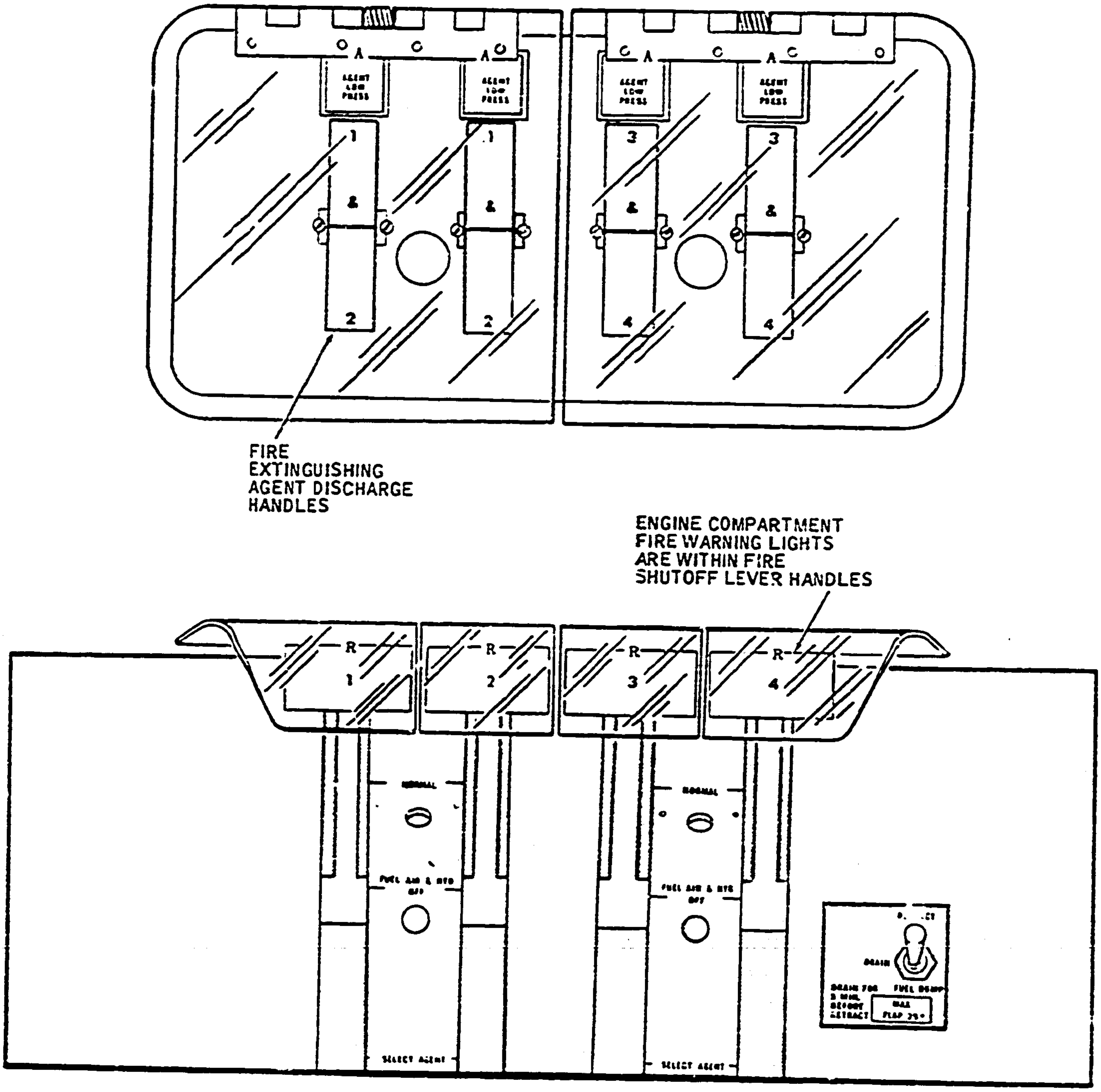
A- AMBER INDICATING LIGHT
R- RED WARNING LIGHT

HA2-6059

Fire Extinguishing System Panel
Figure 1



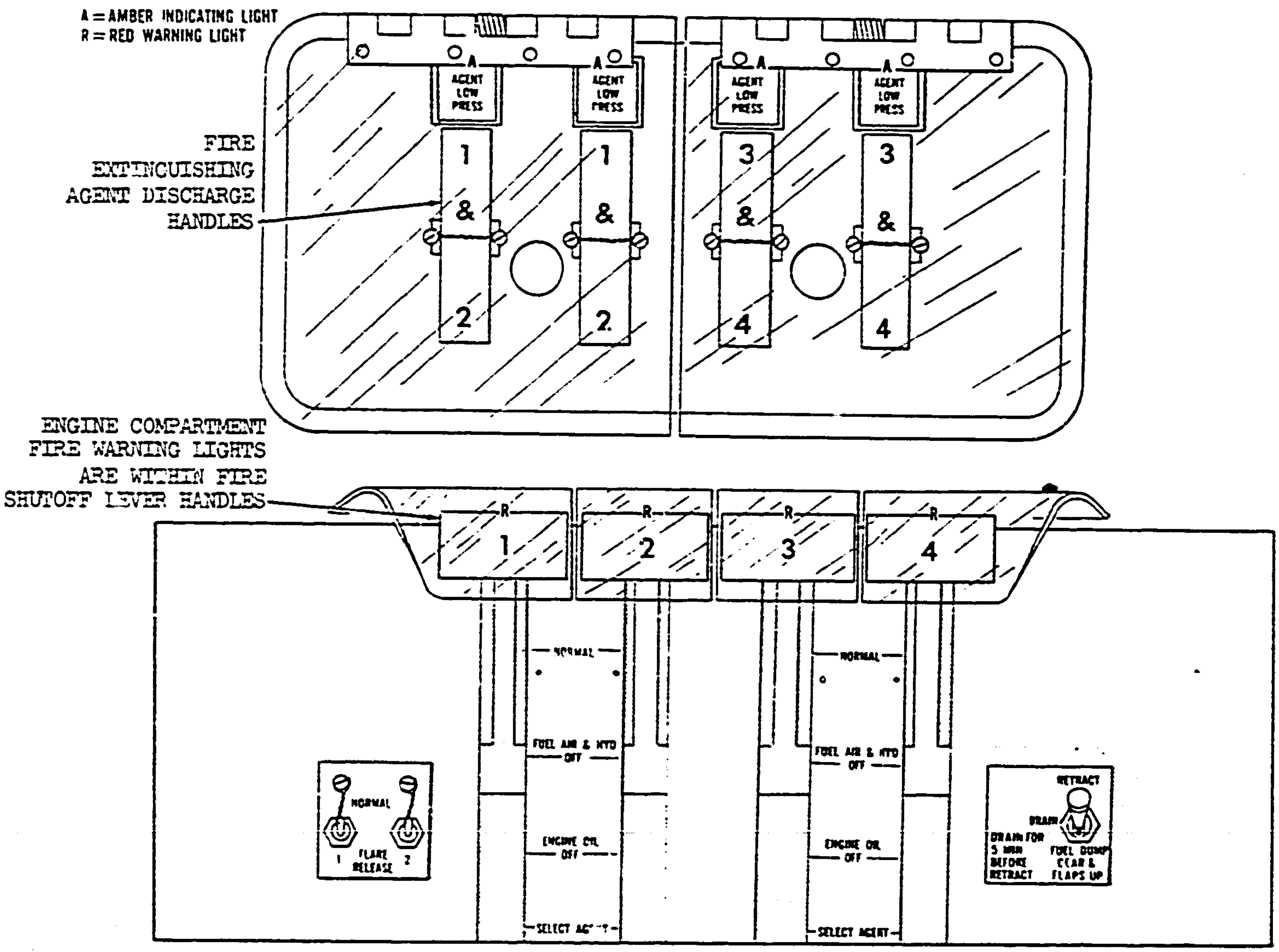
Fire Extinguishing System Panel
Figure 1



A = AMBER INDICATING LIGHT
R = RED WARNING LIGHT

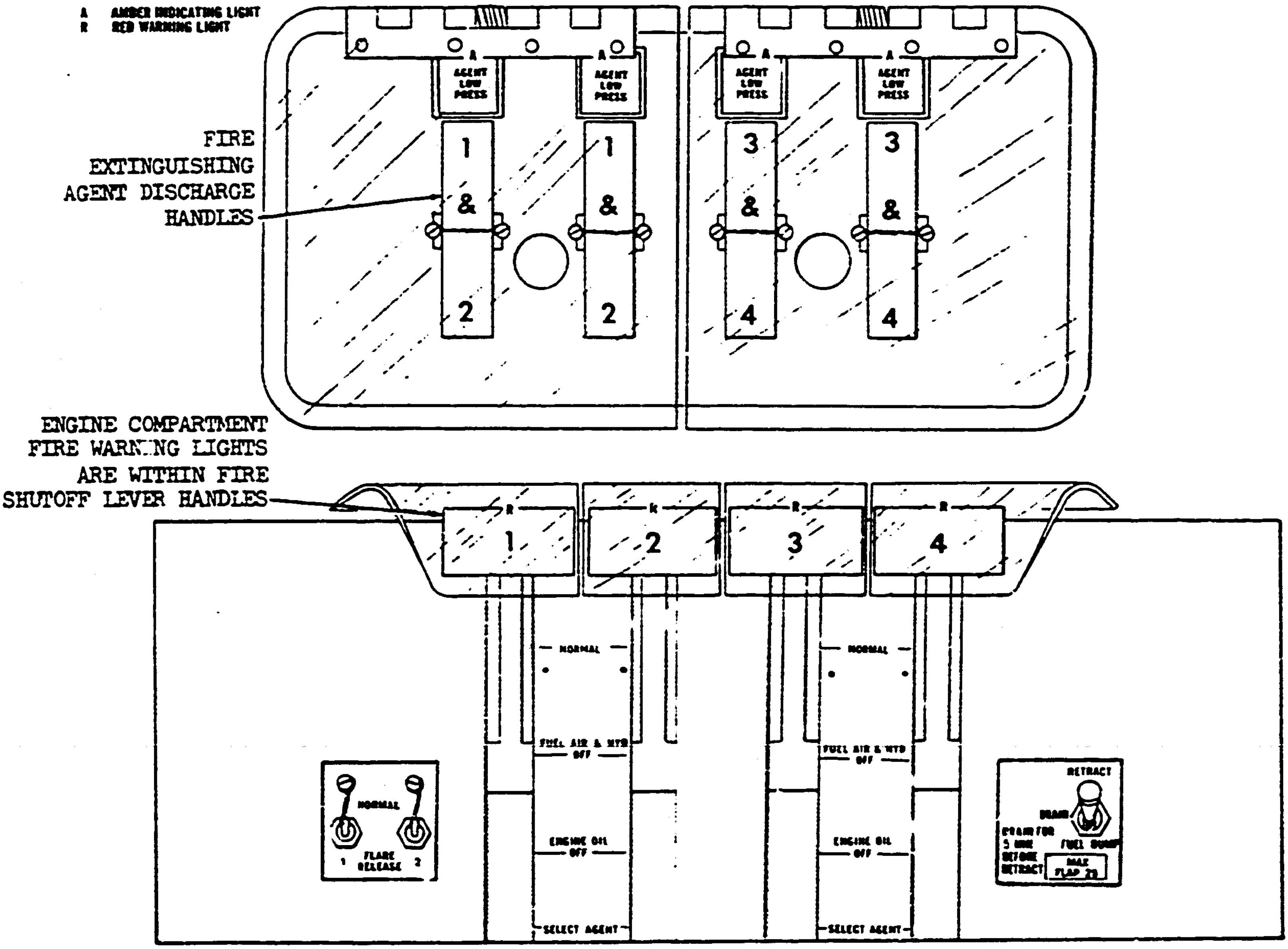
HA2-4397

Fire Extinguishing Ststem Panel
Figure 1



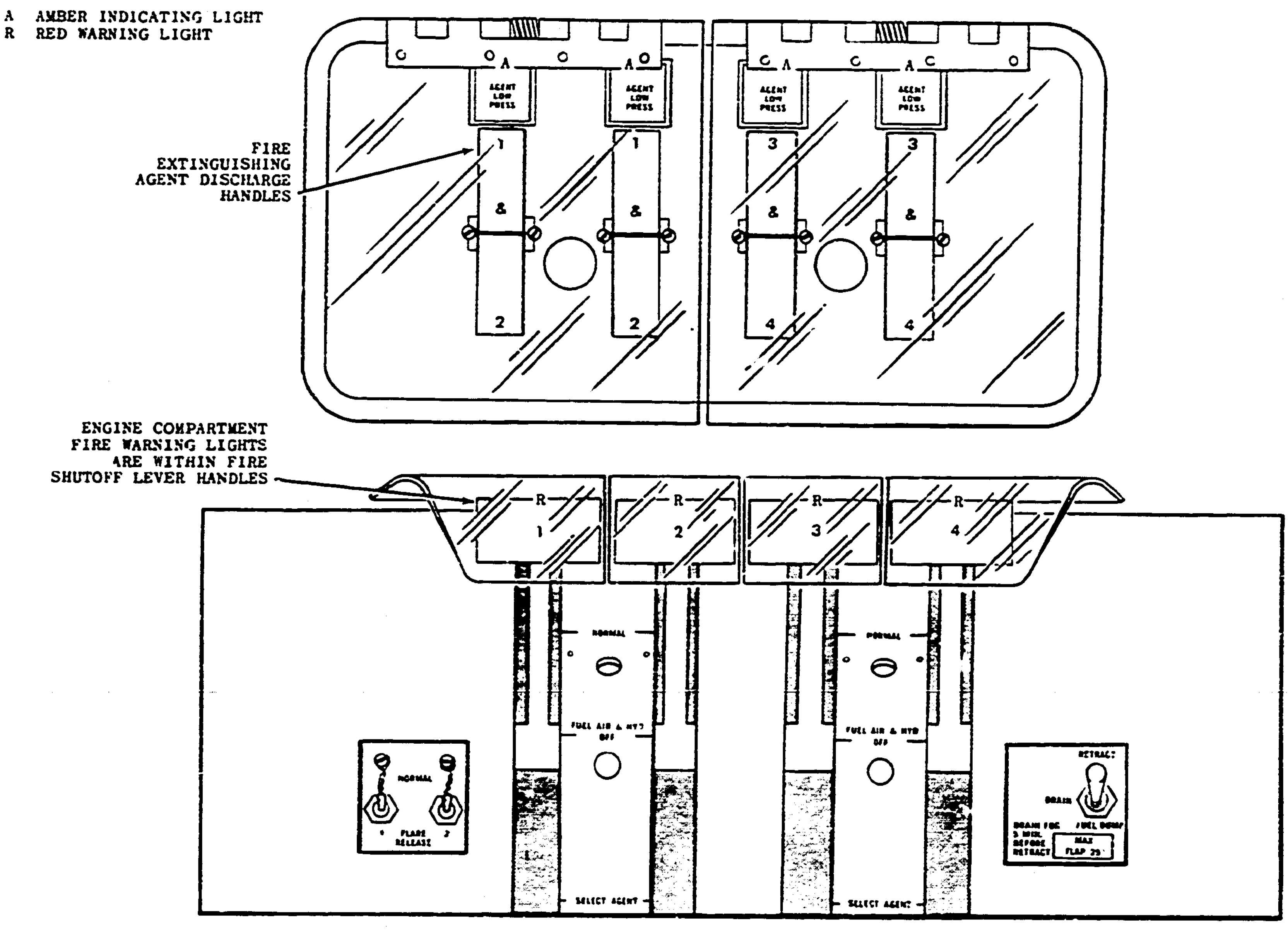
H1-139

Fire Extinguishing System Panel
Figure 1



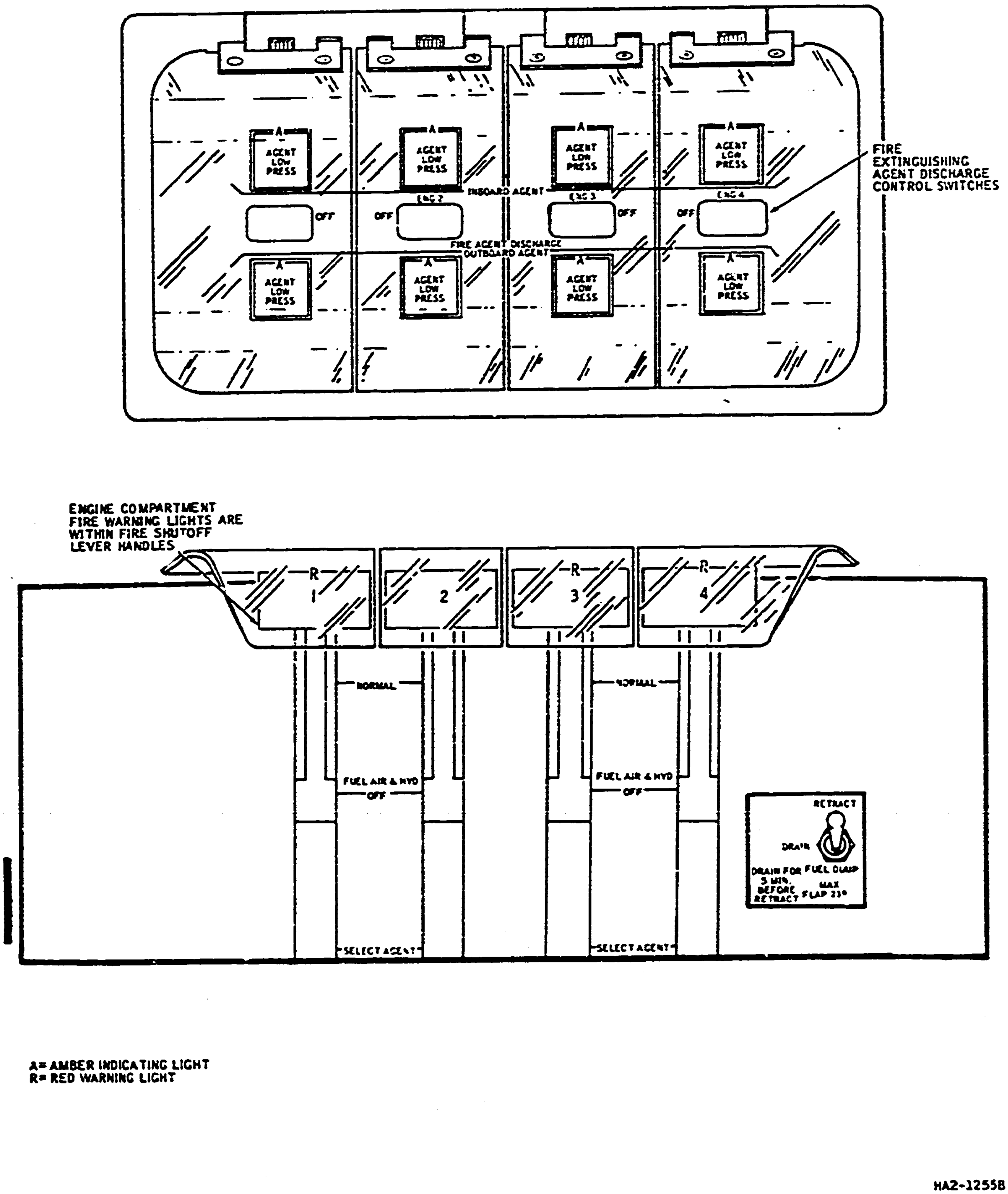
H1-924

Fire Extinguishing System Panel
Figure 1

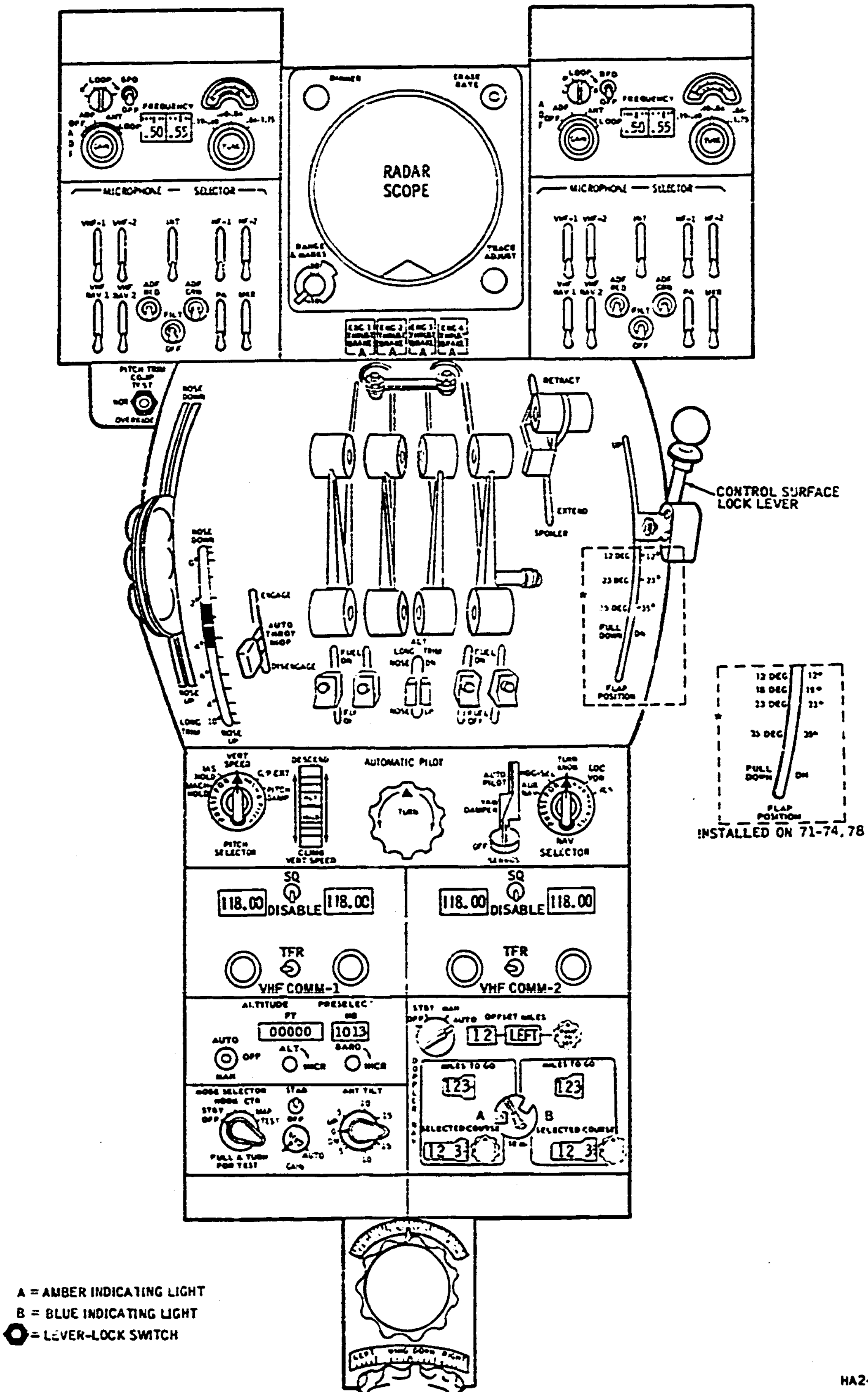


H2-6181

Fire Extinguishing System Panel
Figure 1

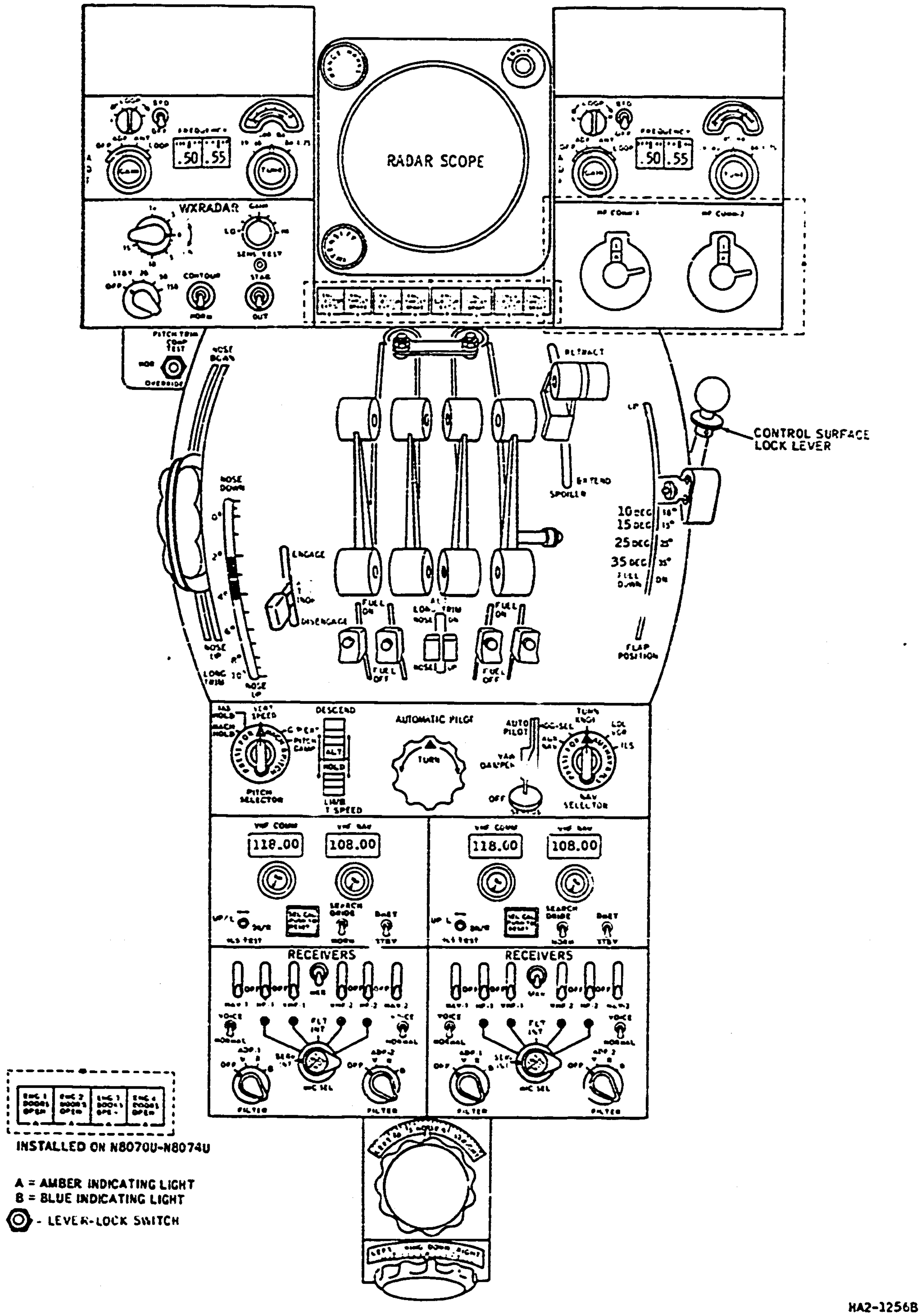


Fire Extinguishing System Panel
Figure 1

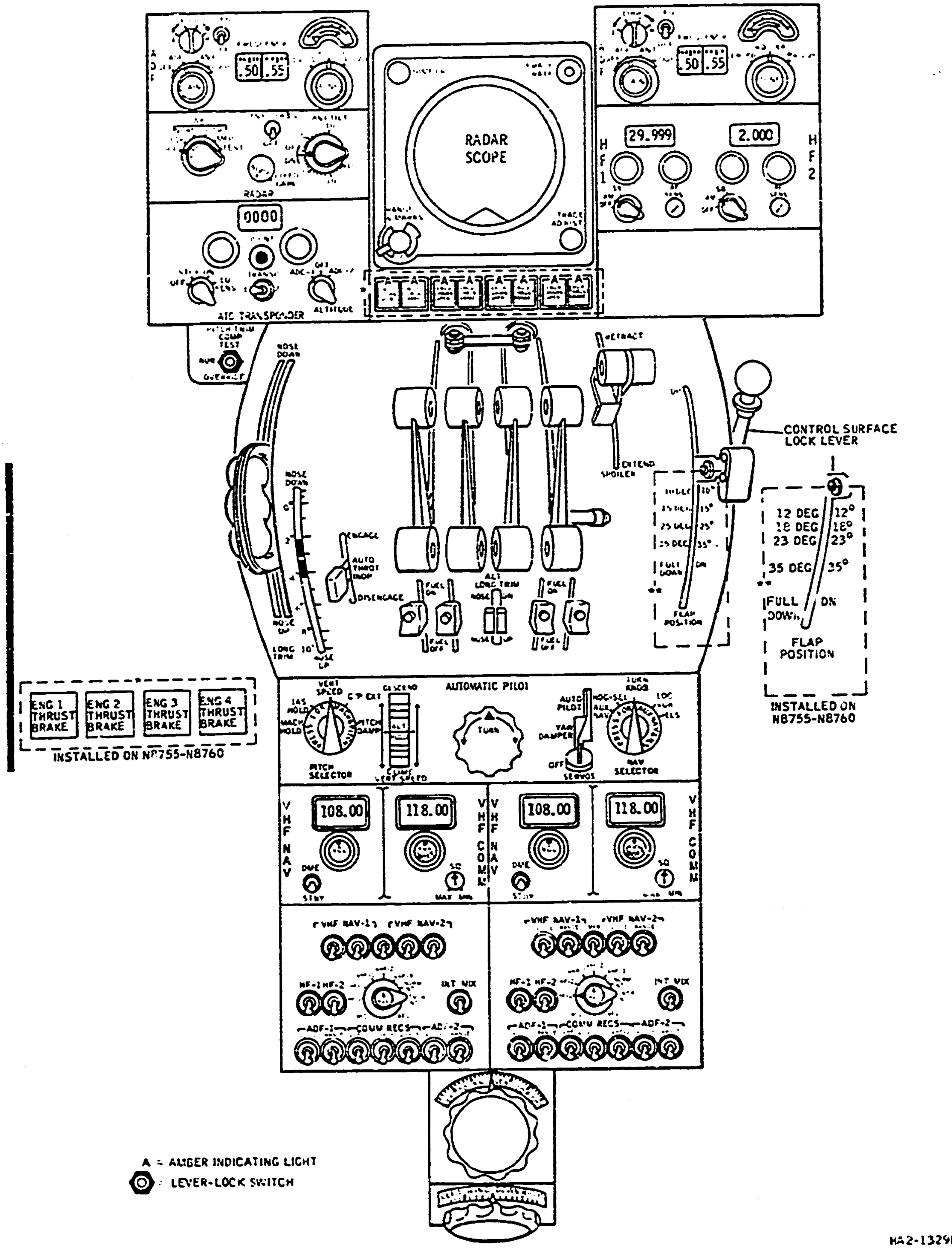


Pilots' Control Pedestal
Figure 1

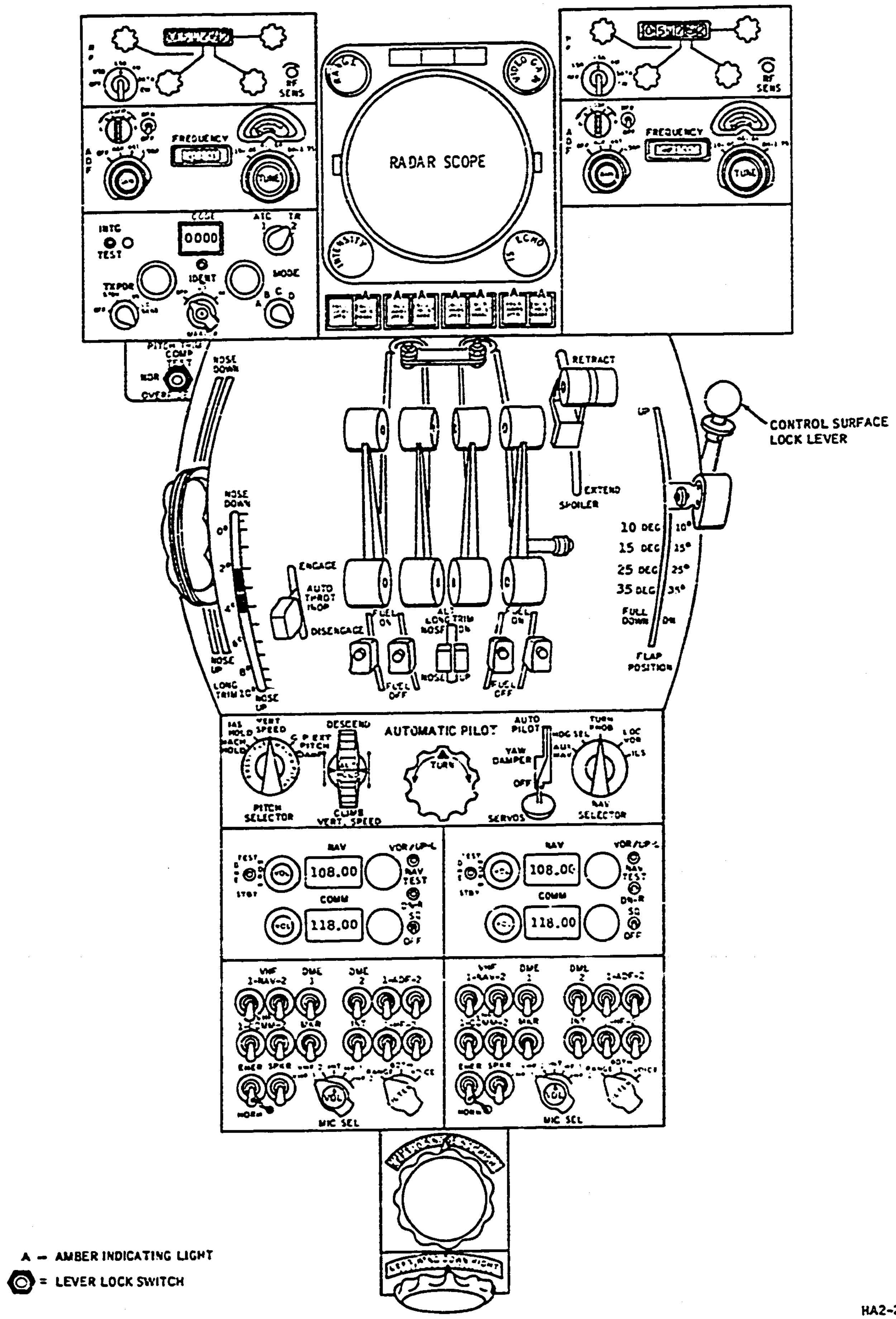
Printed in U.S.A.



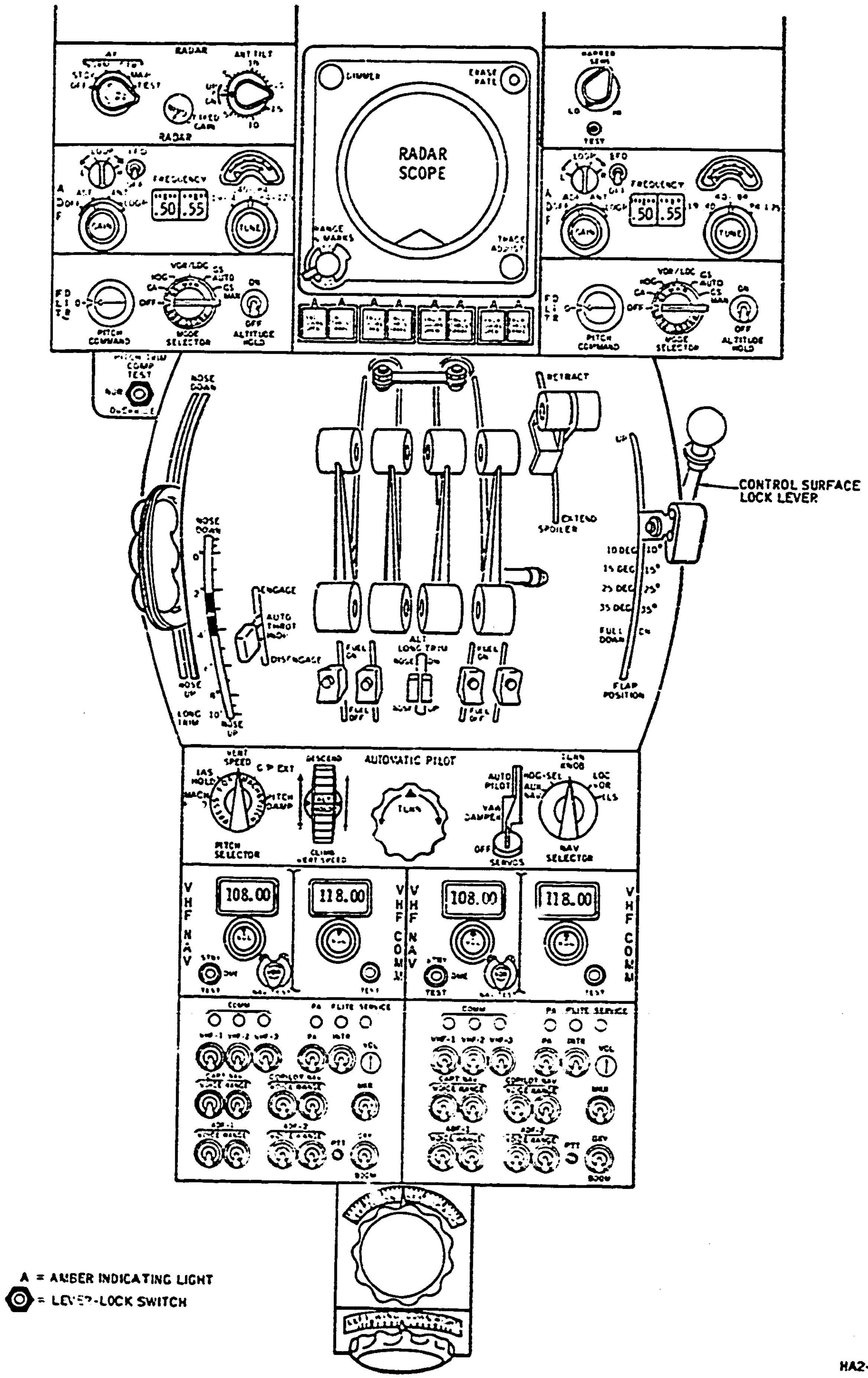
Pilots' Control Pedestal
Figure 1



Pilot's Control Pedestal
Figure 1

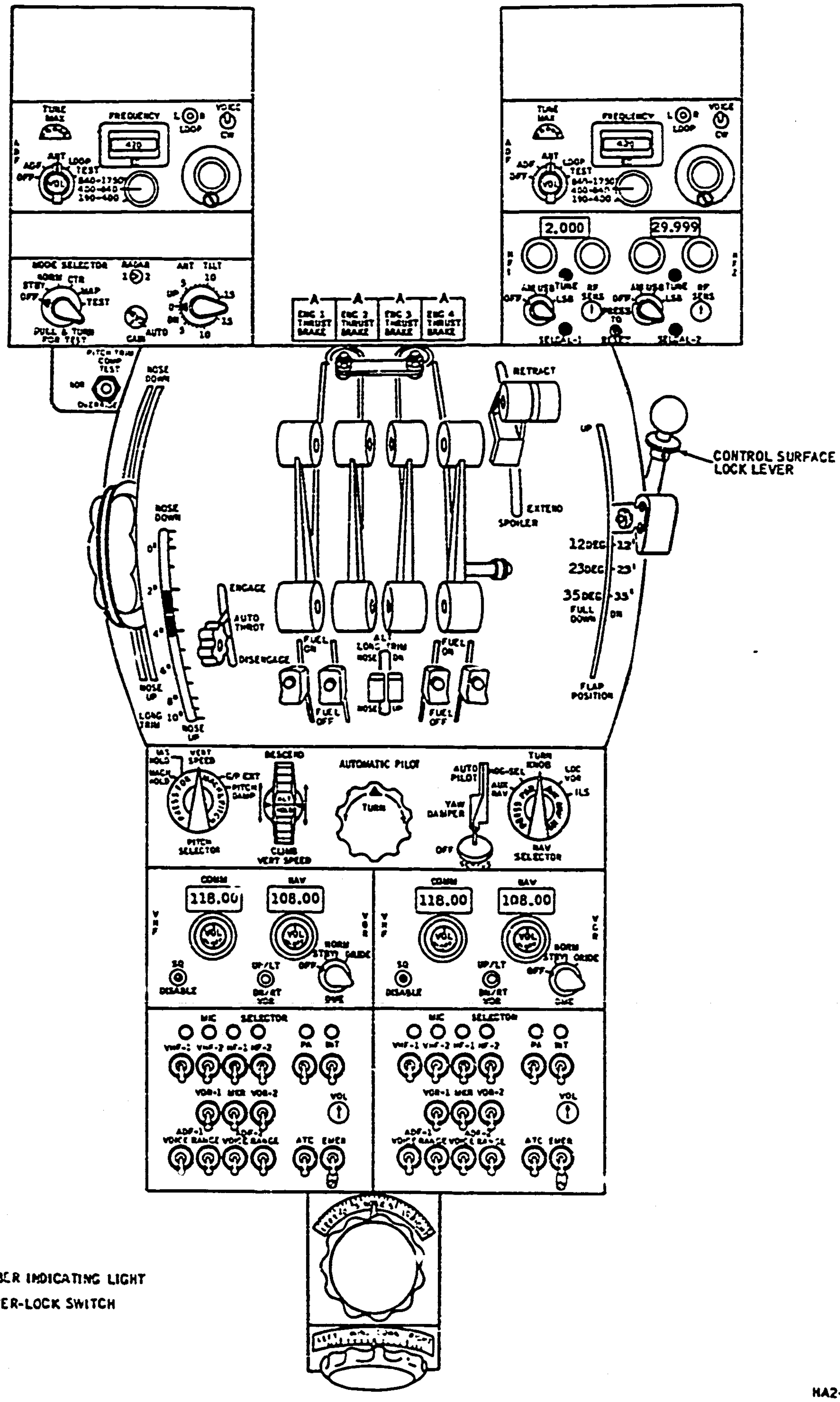


Pilot's Control Pedestal
Figure 1

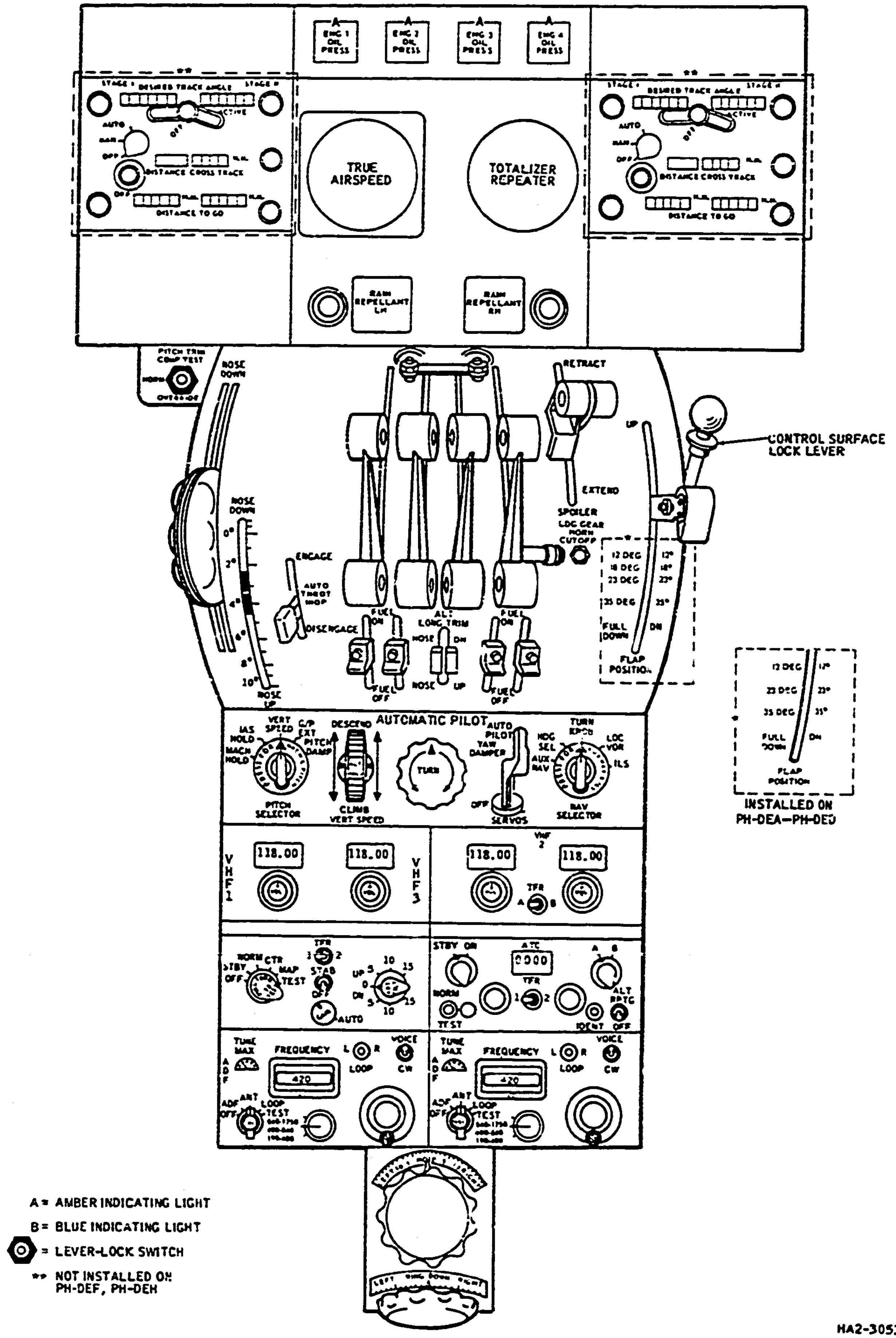


HA2-29698

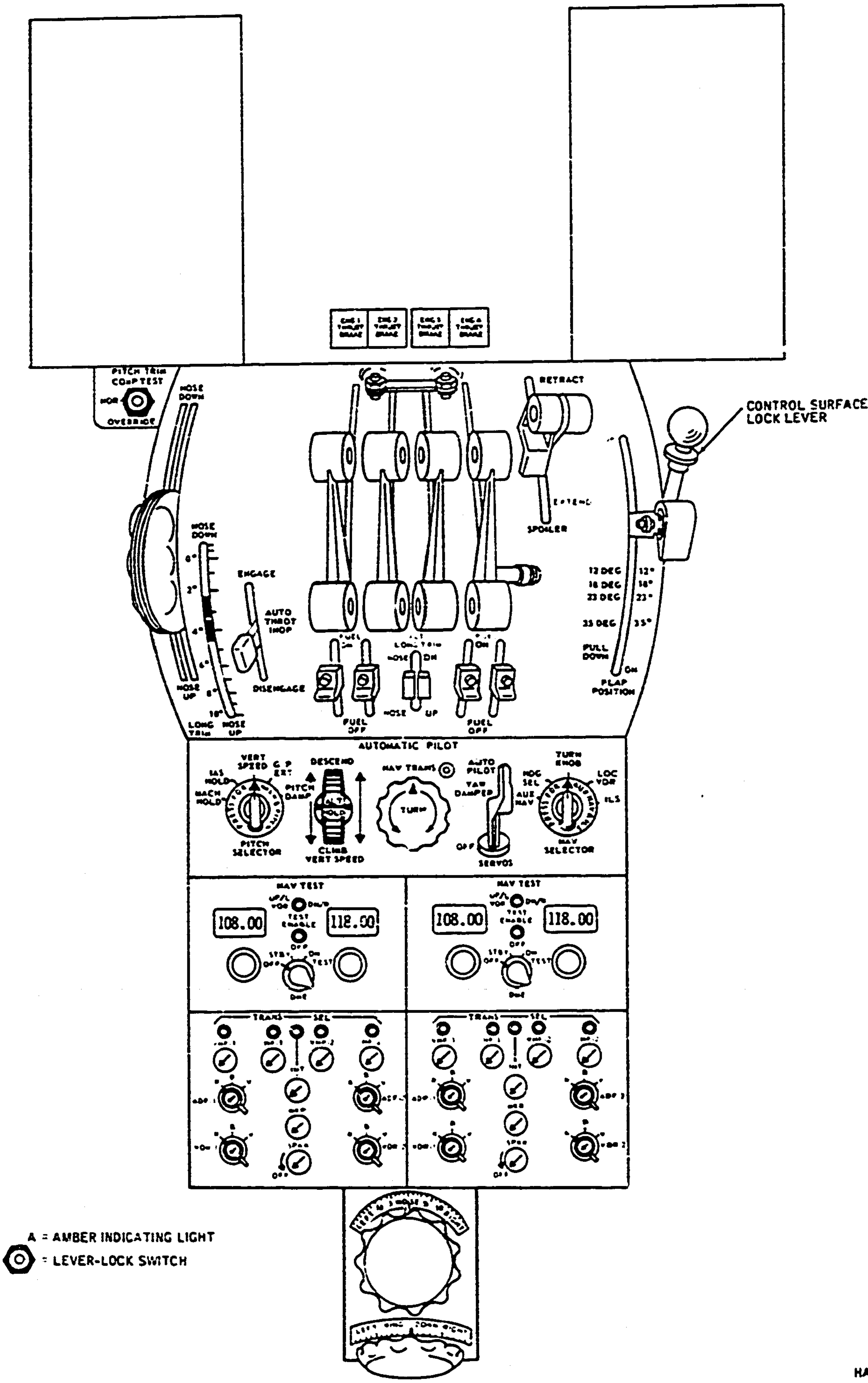
Pilots' Control Pedestal
Figure 1



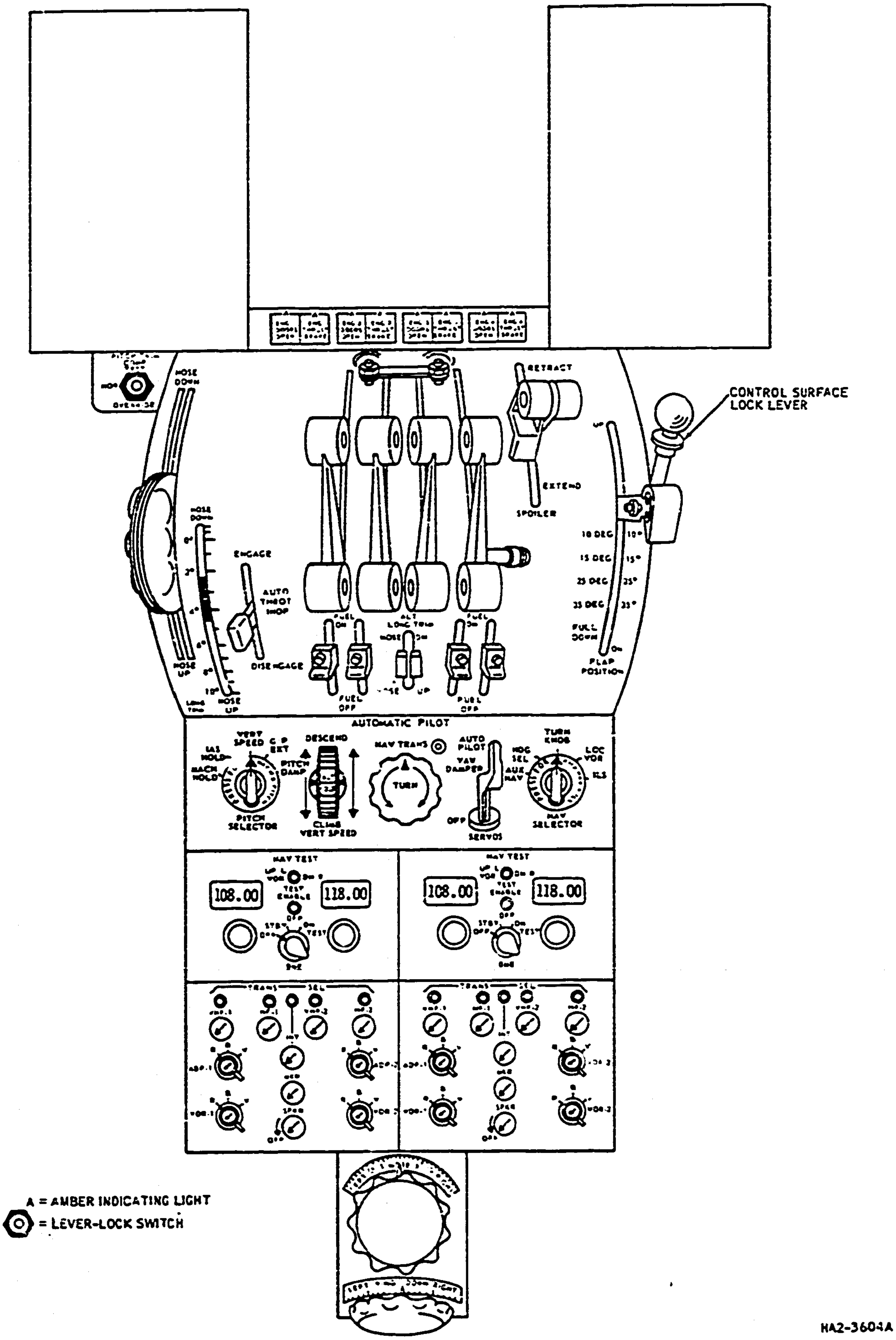
Pilots' Control Pedestal
Figure 1



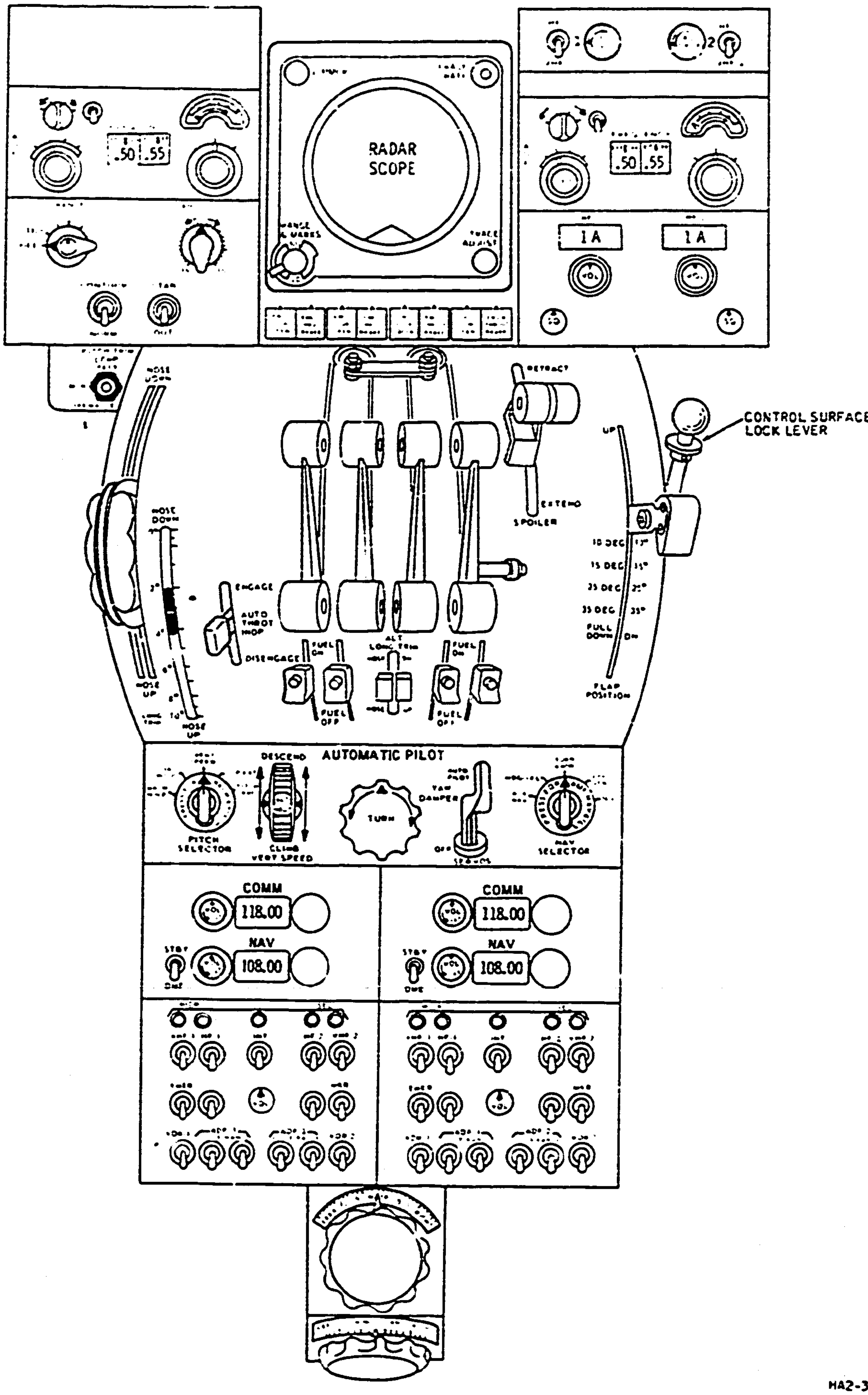
Pilots' Control Pedestal
Figure 1



Pilot's Control Pedestal
Figure 1

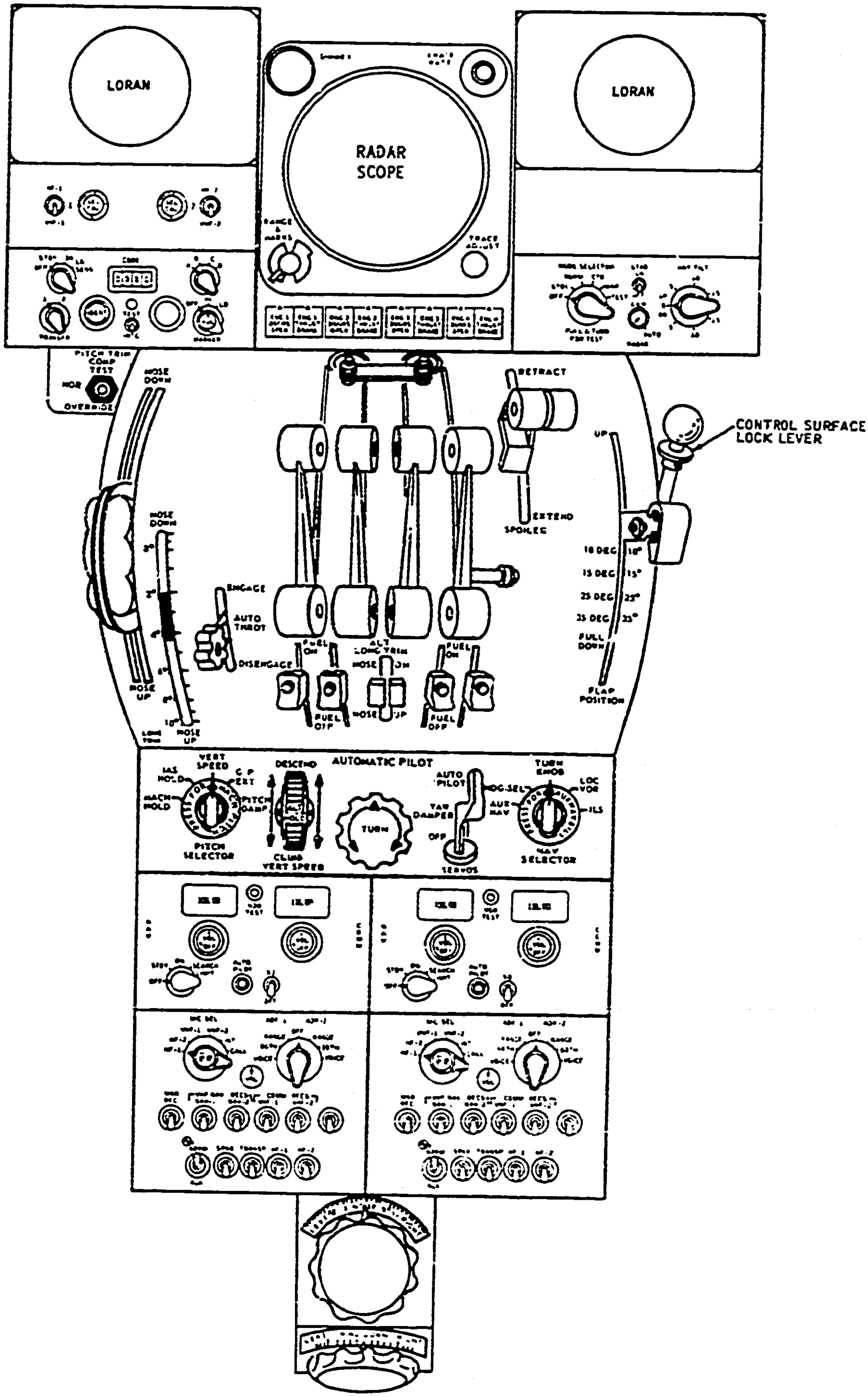


Pilot's Control Pedestal
Figure 1



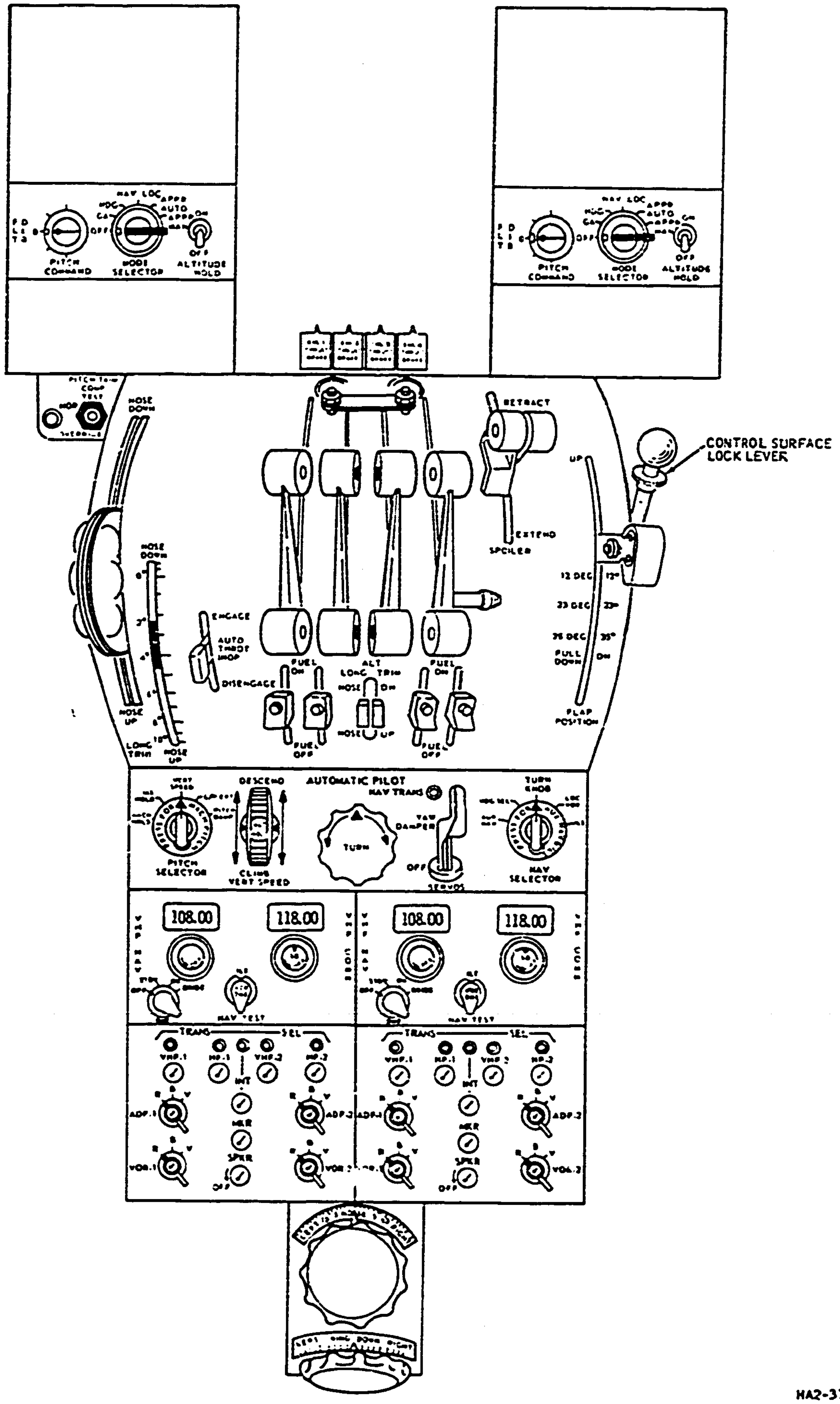
HA2-3633A

Pilots' Control Pedestal
Figure 1

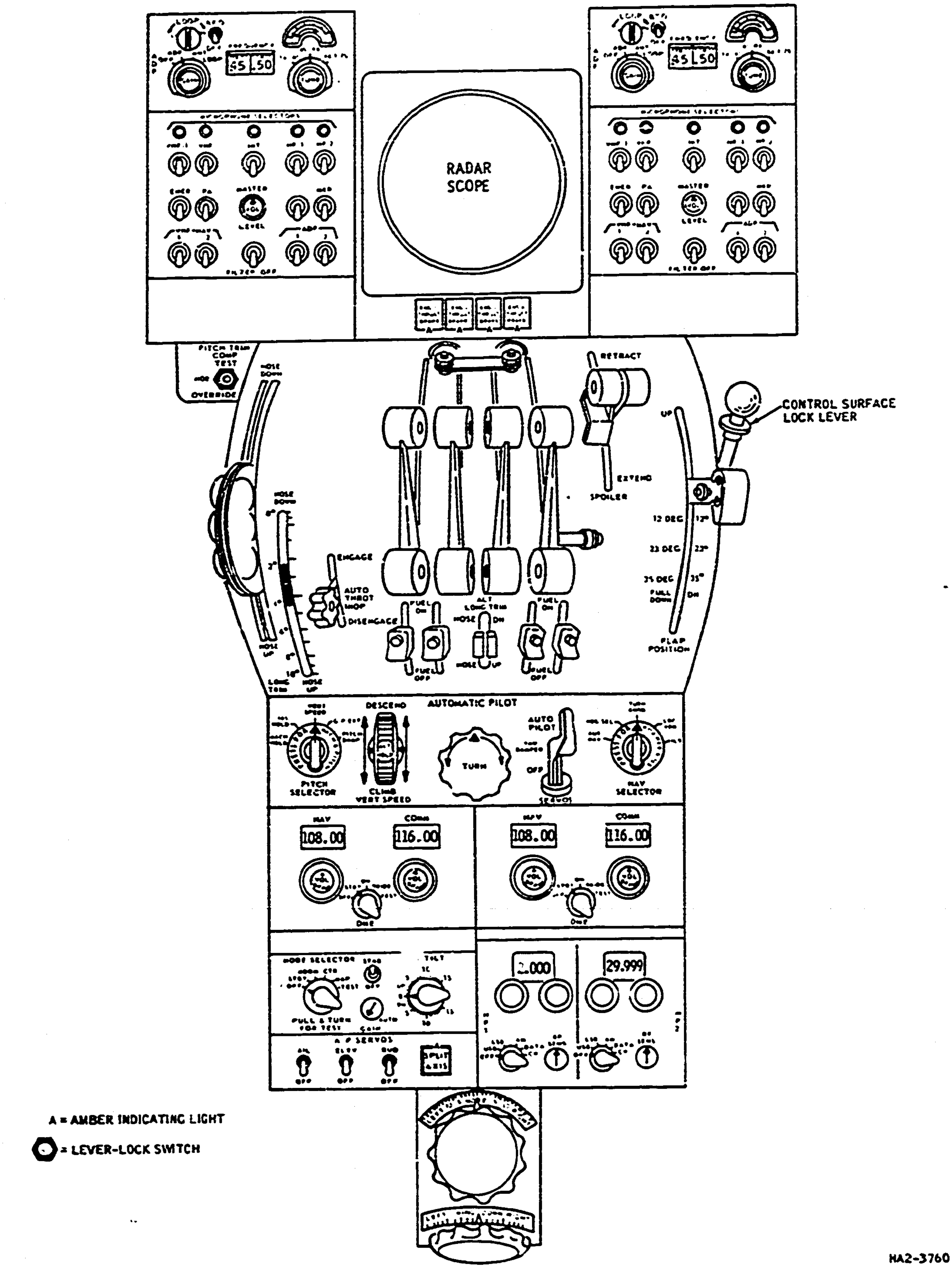


HA2-3652A

Pilots' Control Pedestal
Figure 1

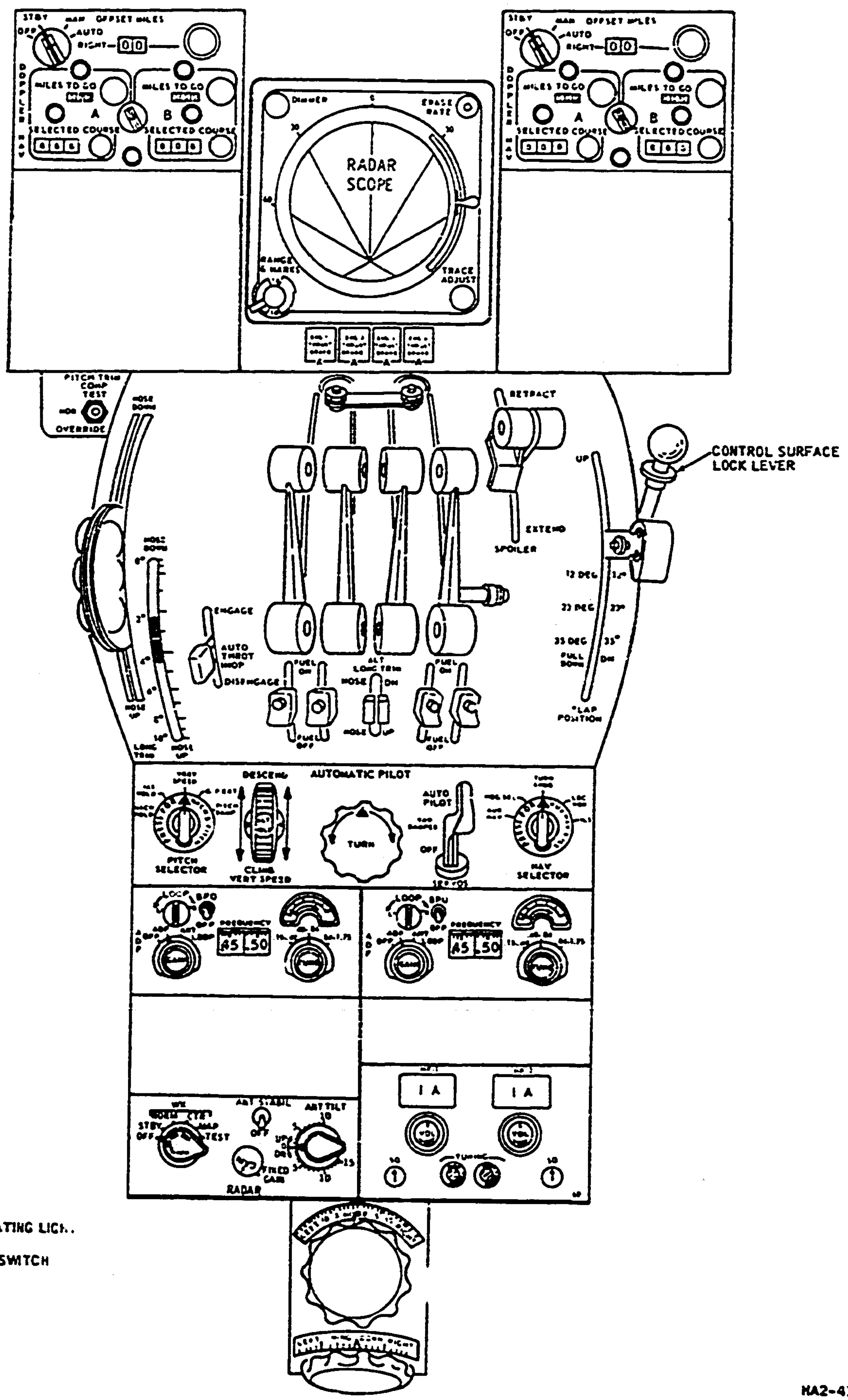


Pilot's Control Pedestal
Figure 1



Pilot's Control Pedestal
Figure 1

Printed in U.S.A.

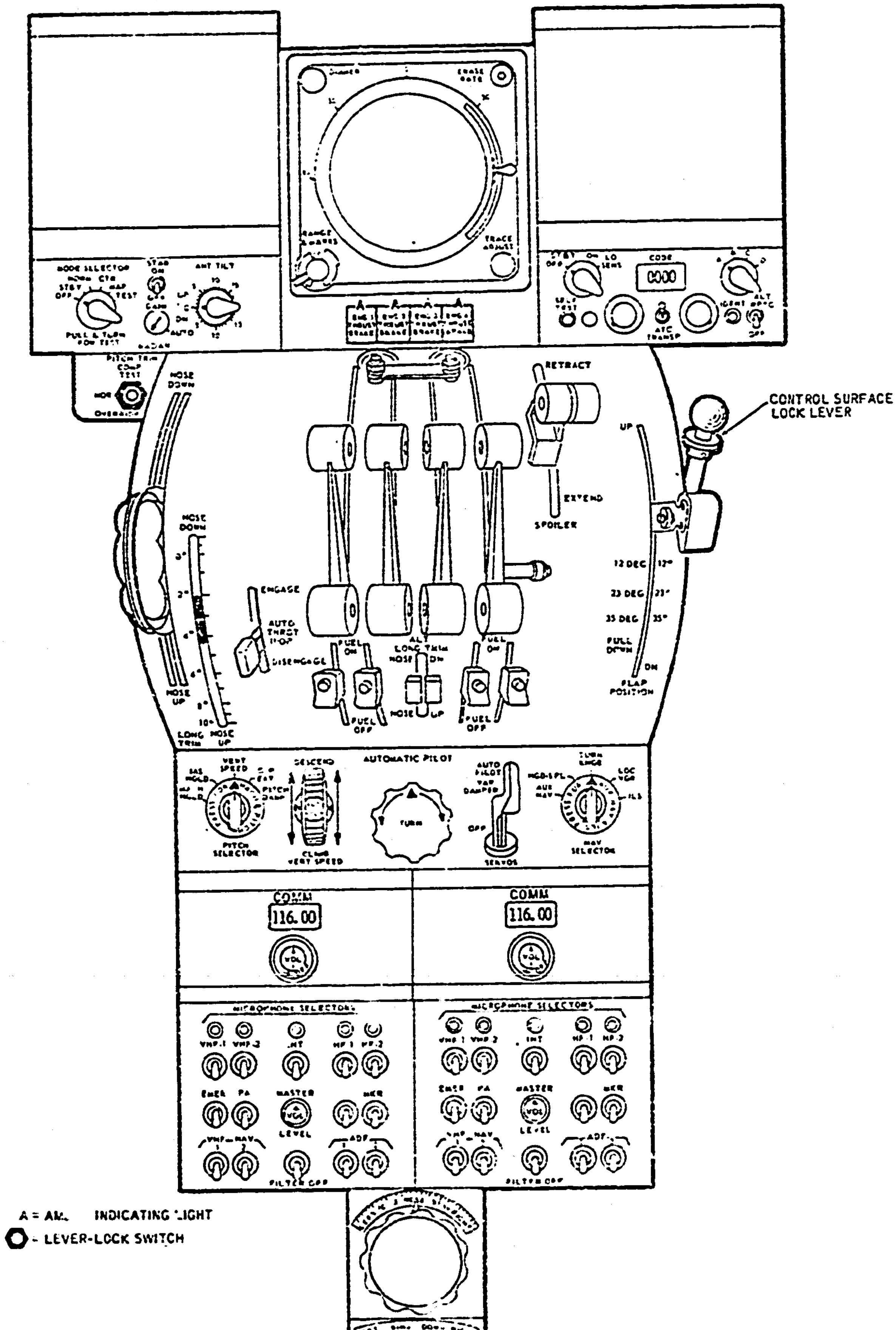


A = AMBER INDICATING LIGHT

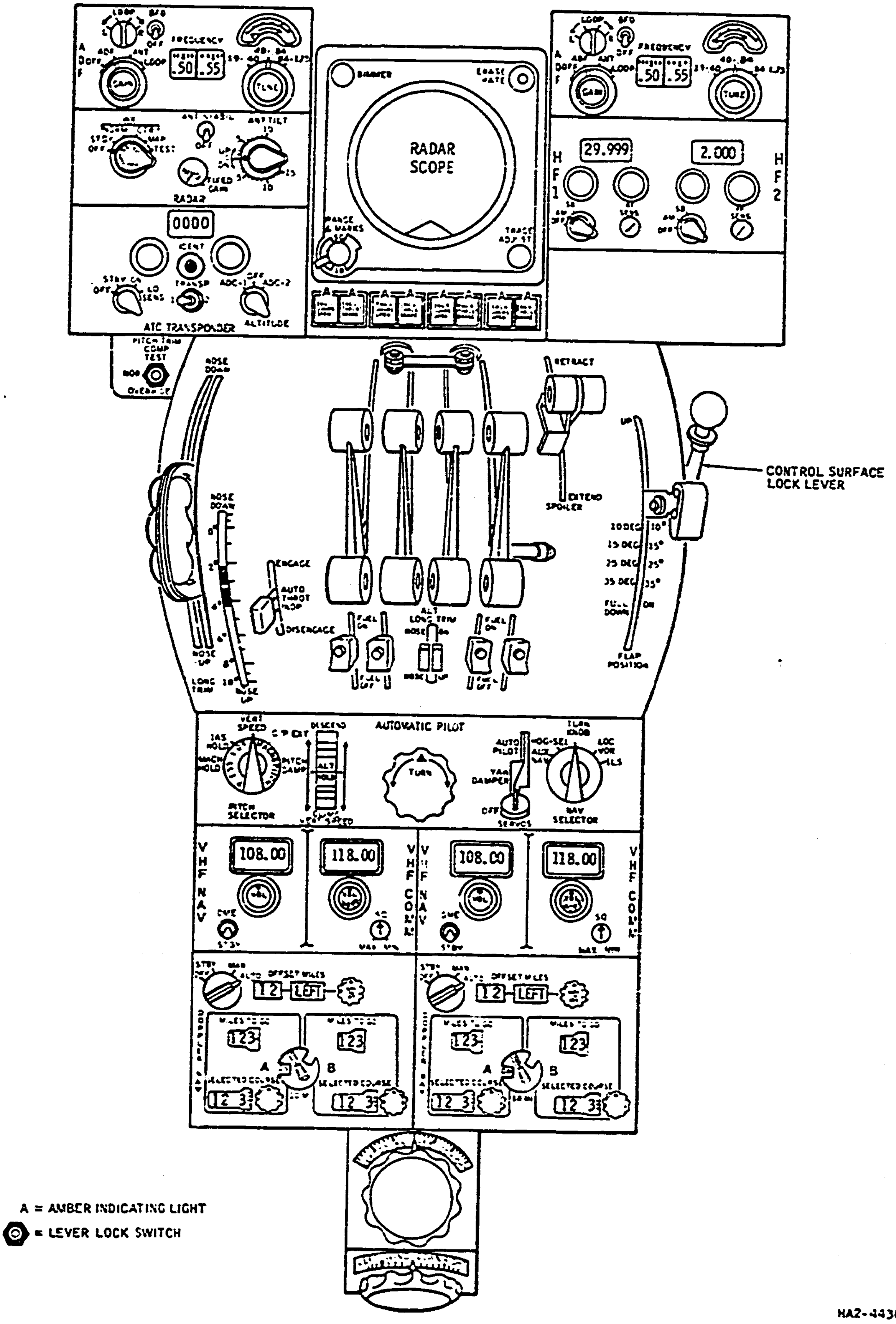
⊙ = LEVER-LOCK SWITCH

HA2-4151B

Pilots' Control Pedestal
Figure 1



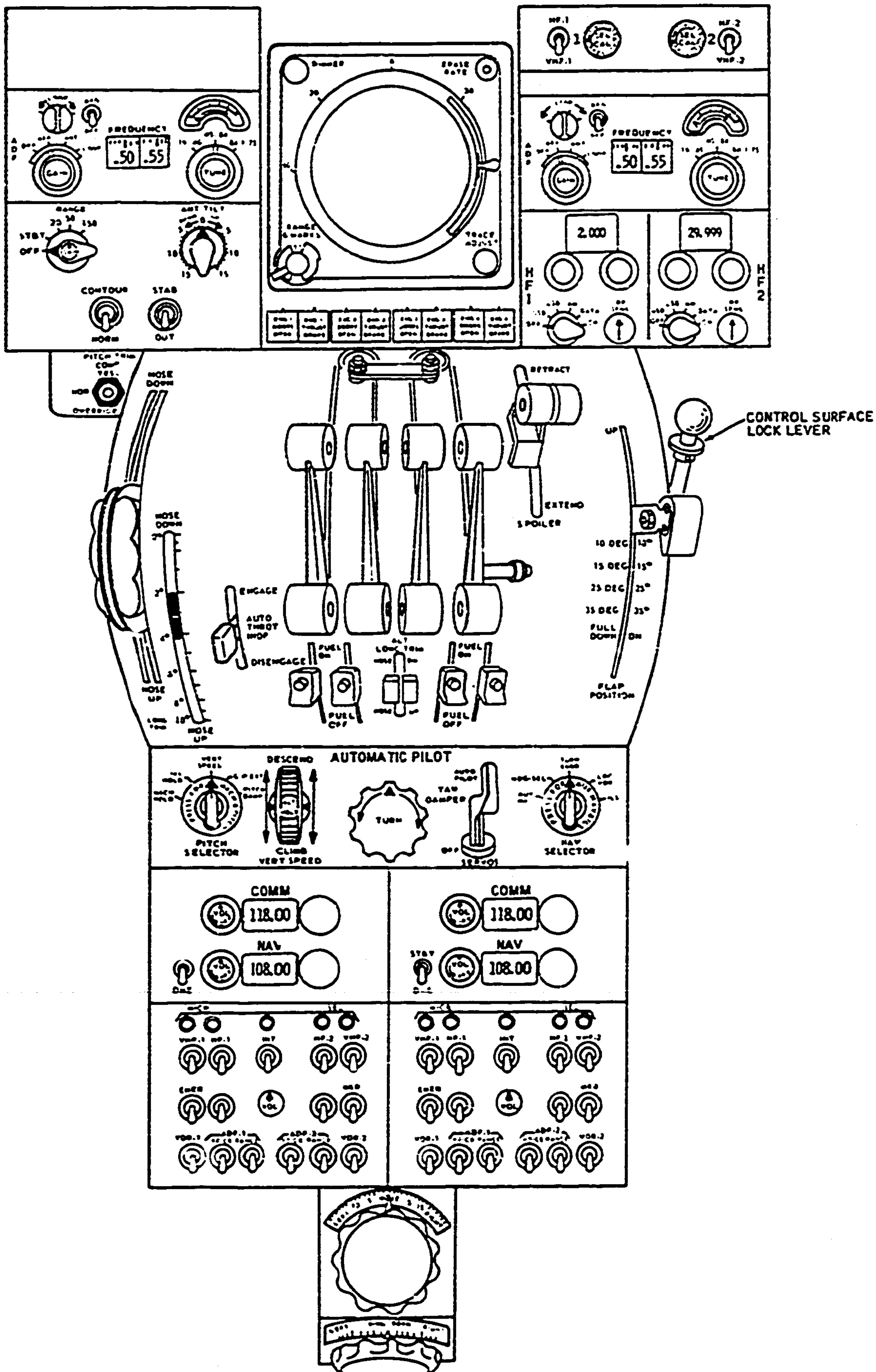
Pilots' Control Pedestal
Figure 1



HA2-4430

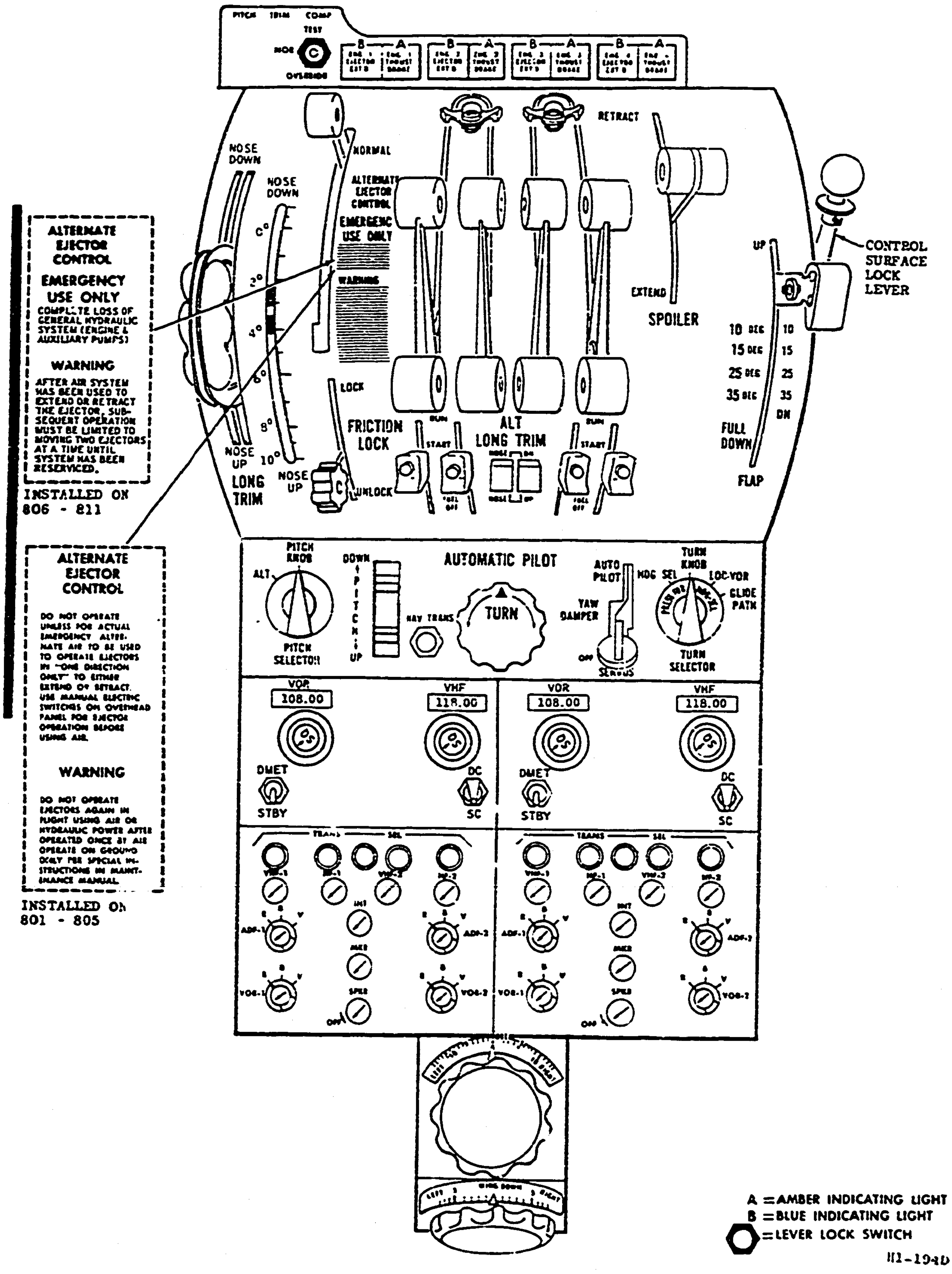
Pilots' Control Pedestal
Figure 1

Printed in U.S.A.

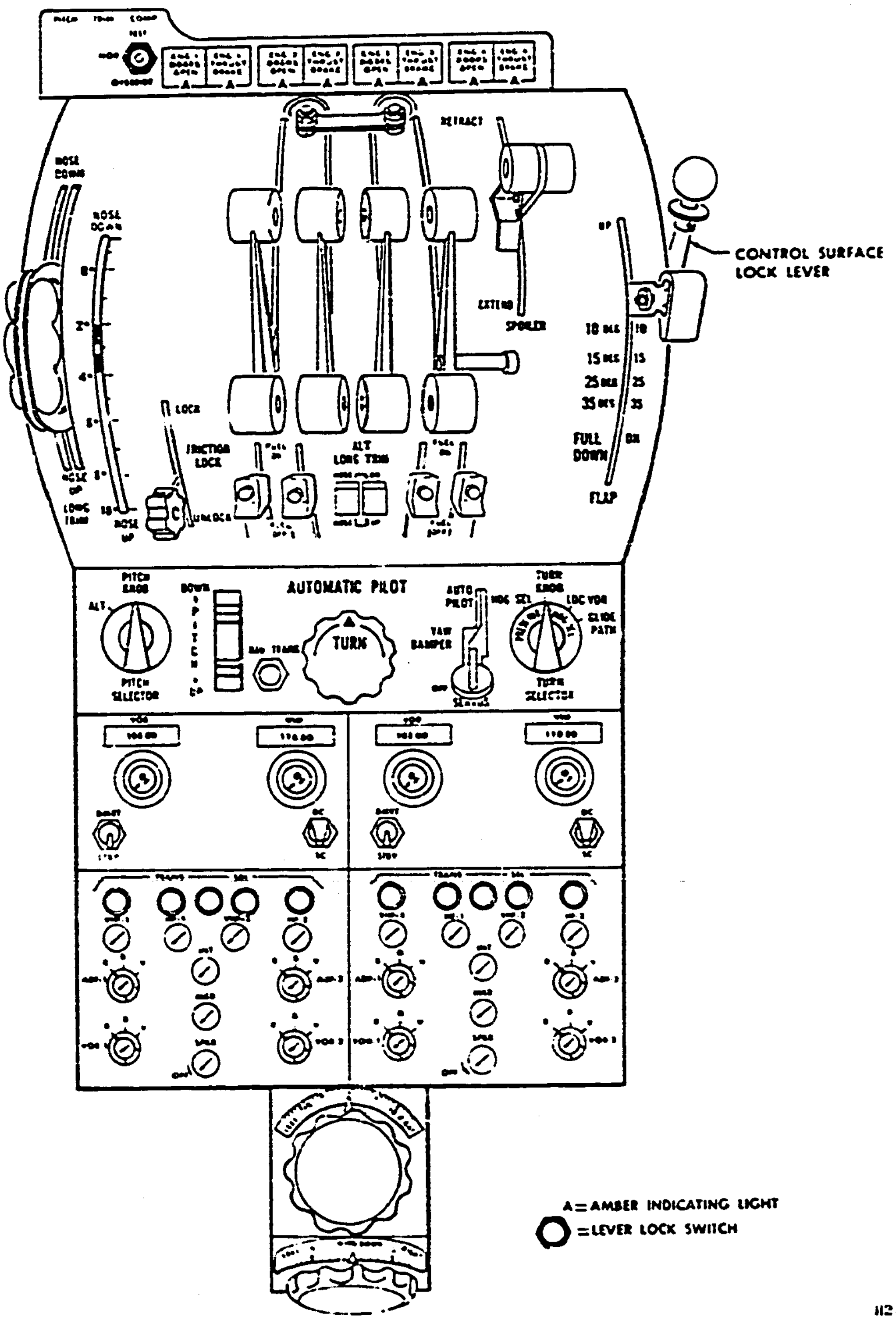


HA2-4518

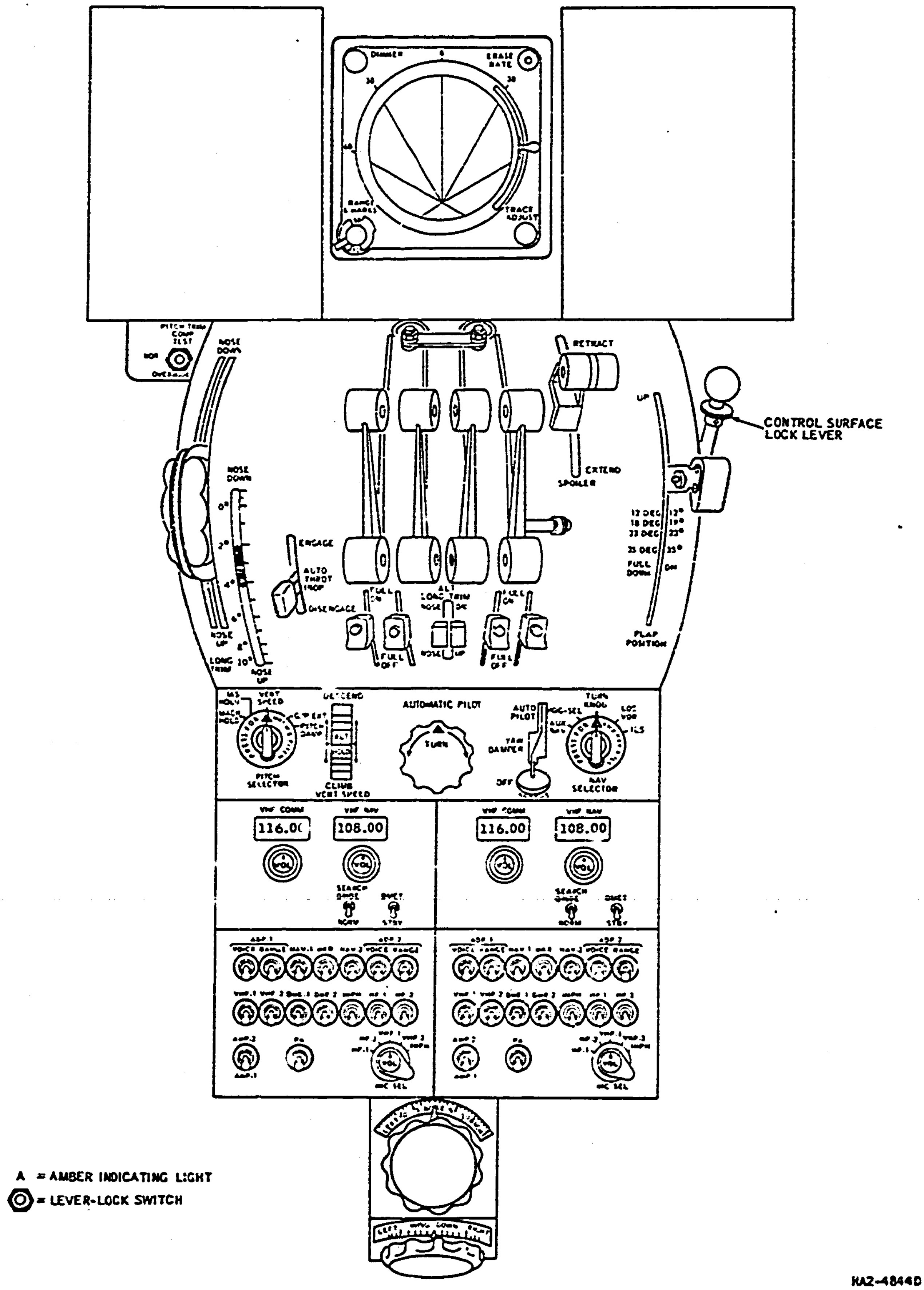
Pilots' Control Pedestal
Figure 1



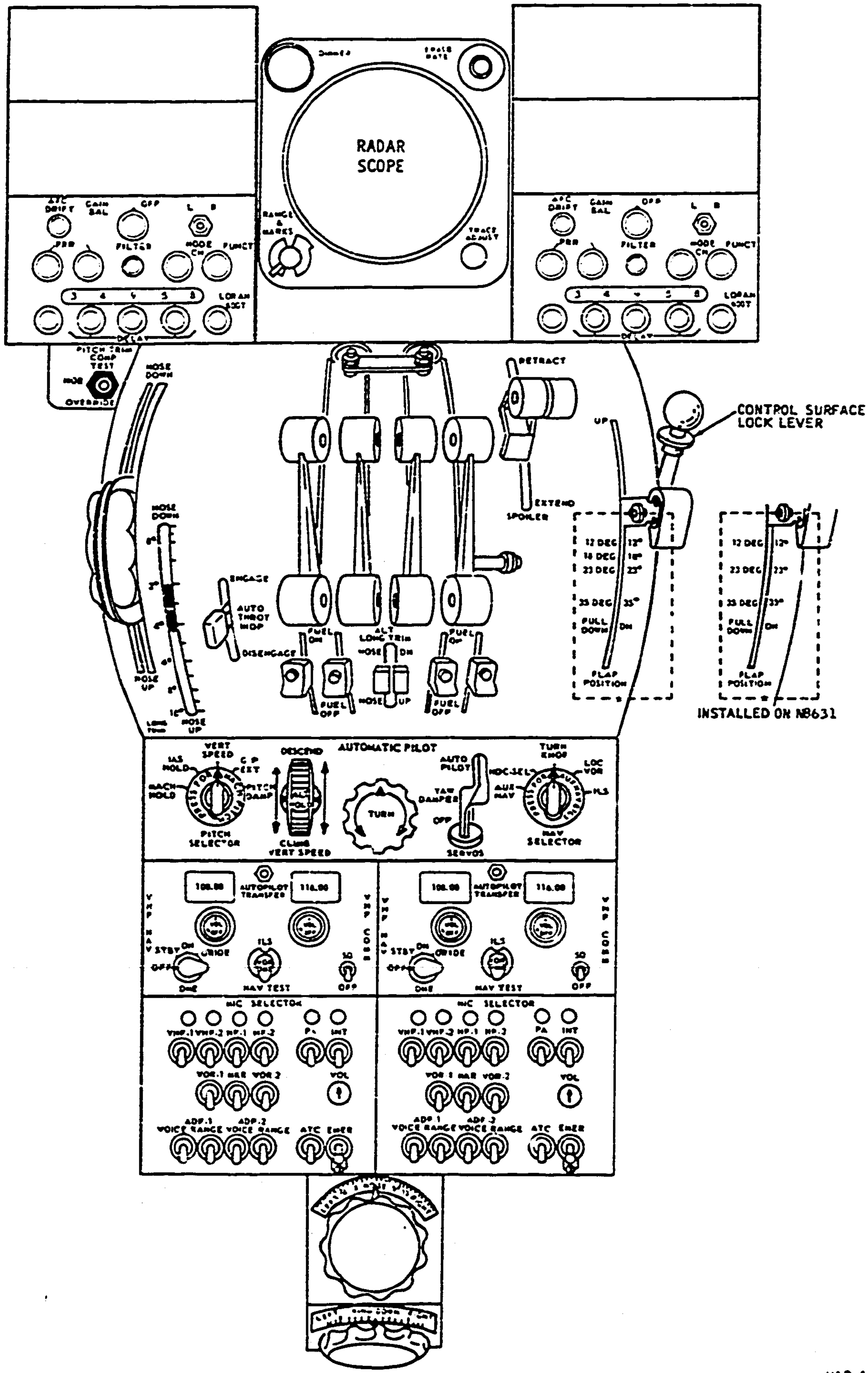
Pilots' Control Pedestal
Figure 1



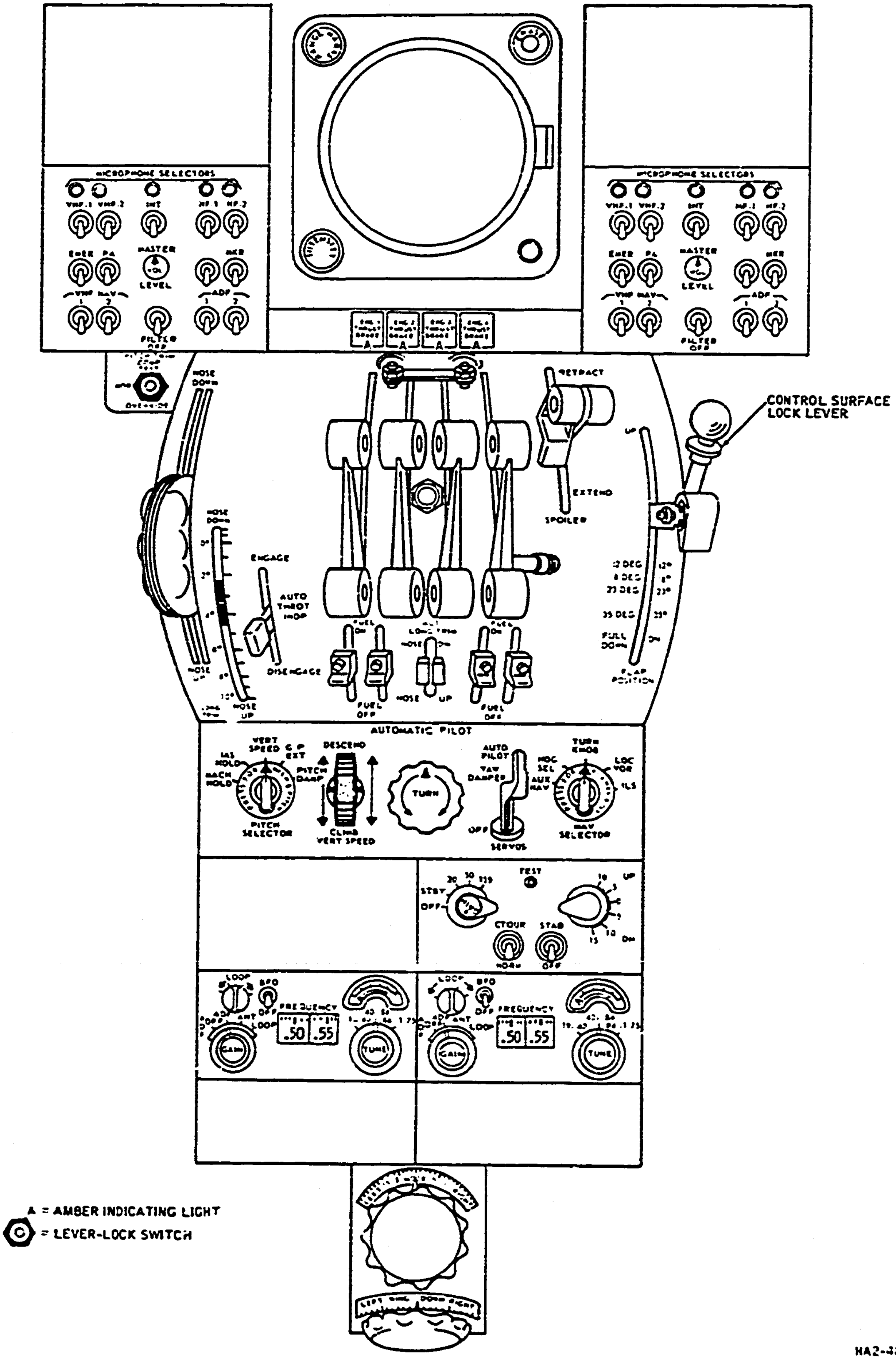
Pilots' Control Pedestal
Figure 1



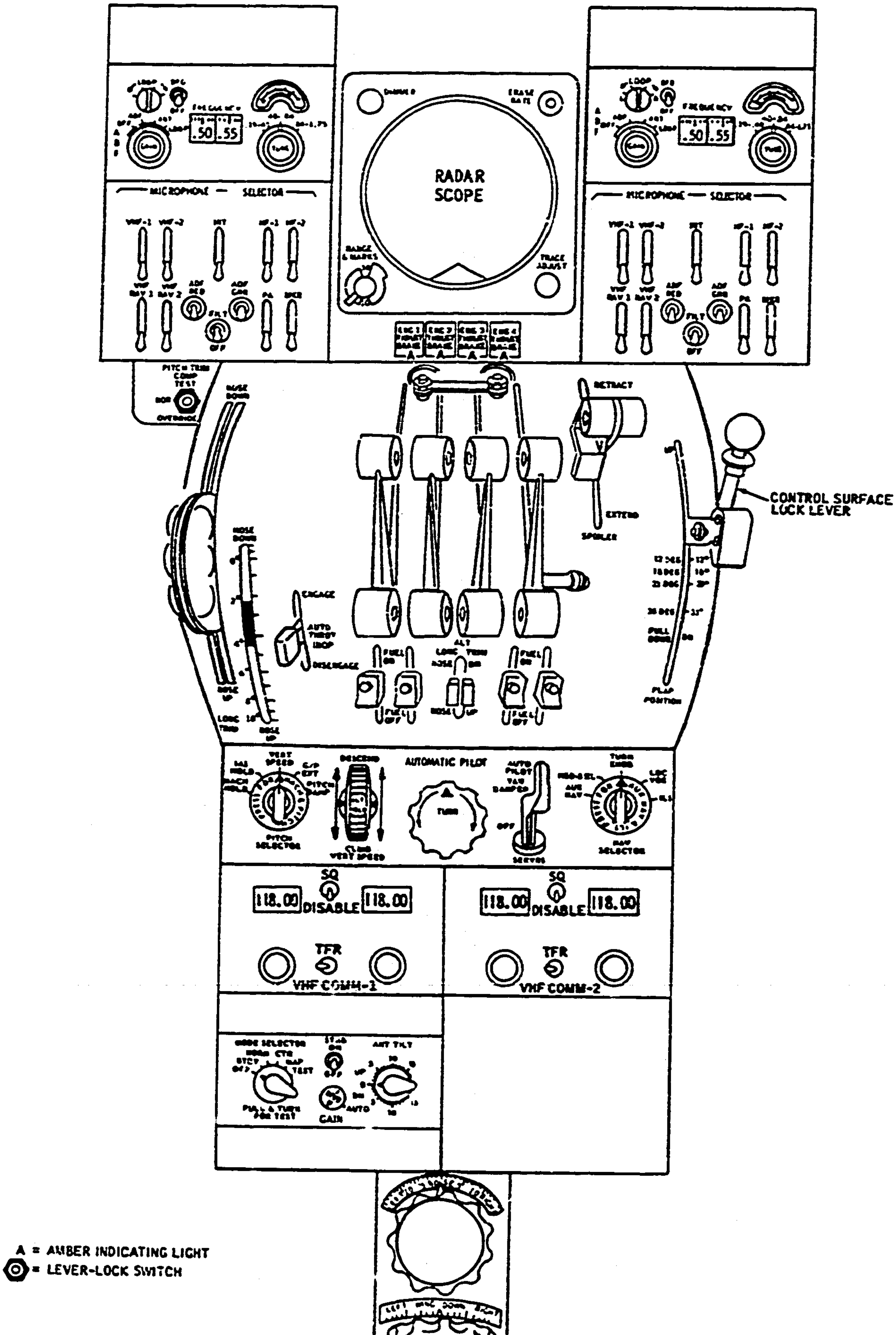
Pilots' Control Pedestal
Figure 1



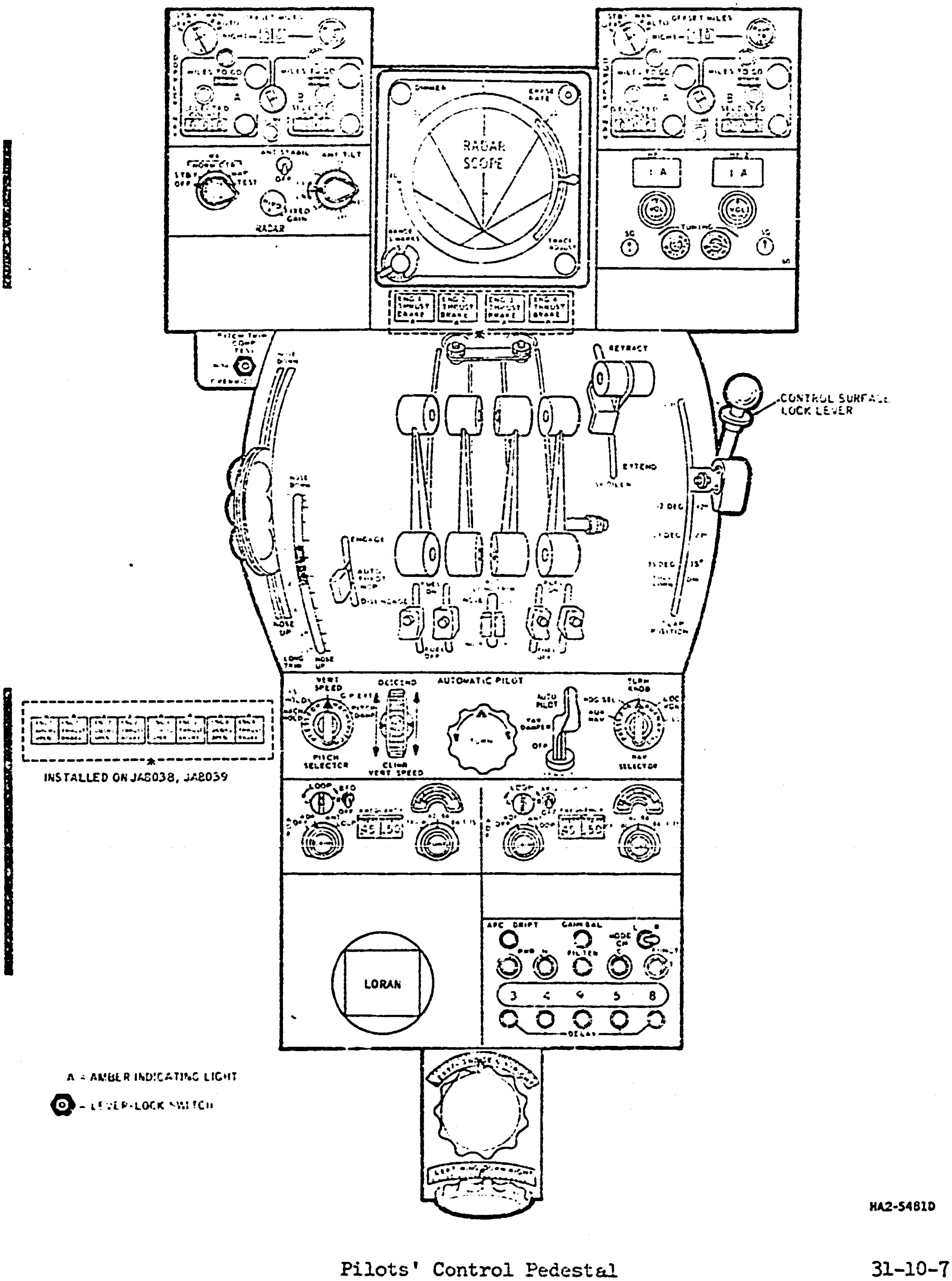
Pilots' Control Pedestal
Figure 1



Pilots' Control Pedestal
Figure 1

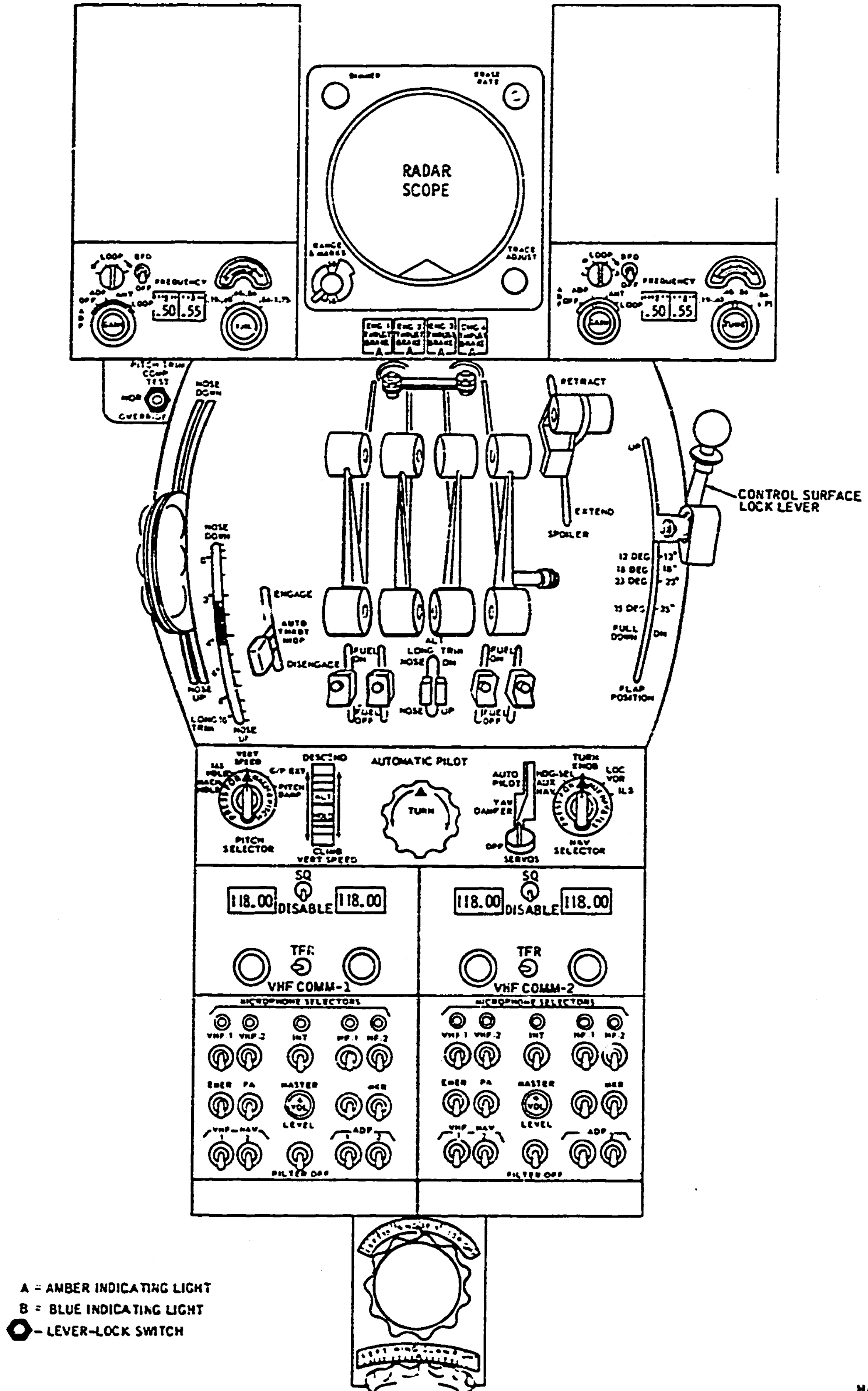


Pilots' Control Panel
Figure 1



Pilots' Control Pedestal
Figure 1

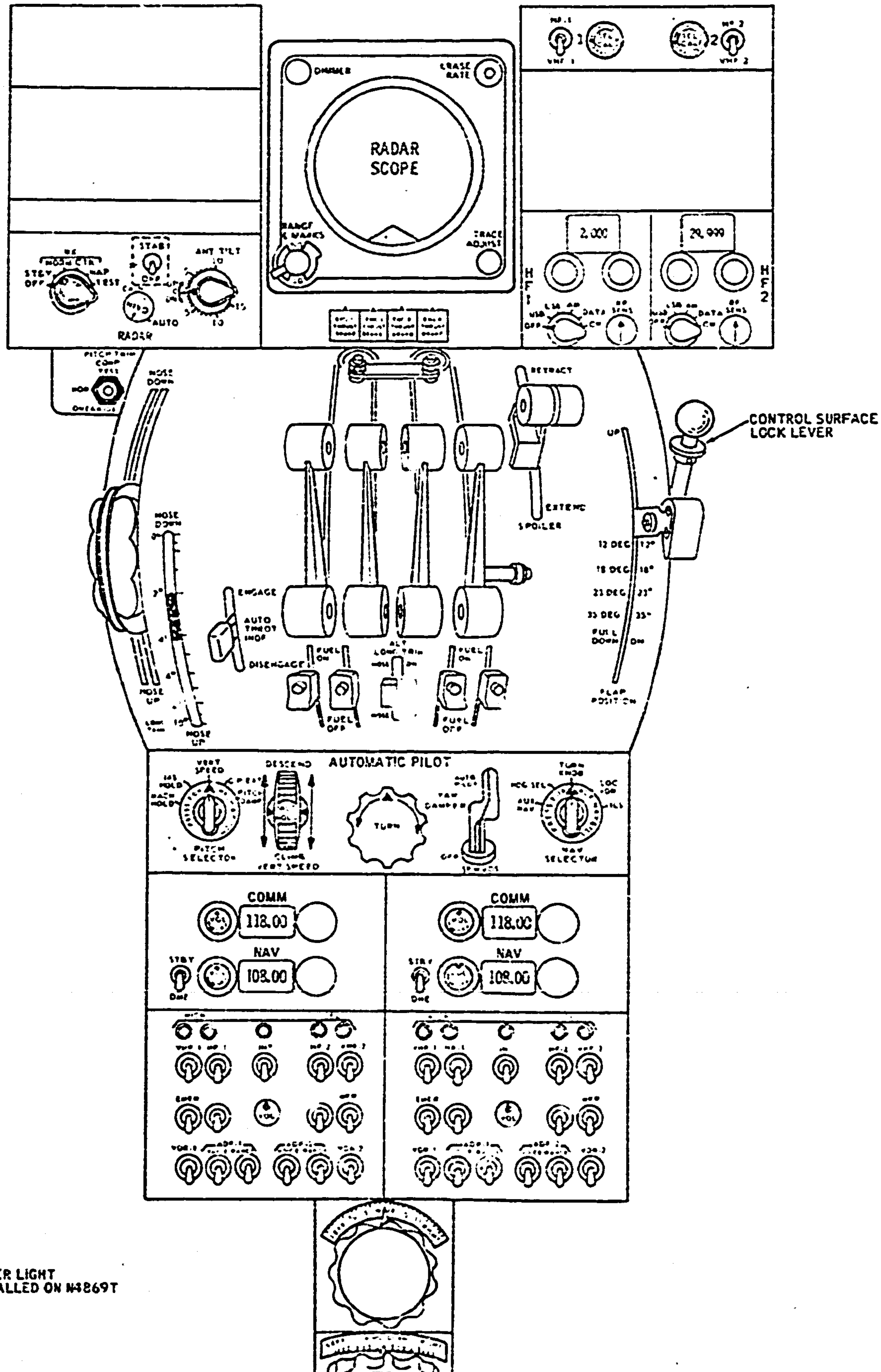
Printed in U.S.A.



HA2-5612A

Pilots' Control Pedestal
Figure 1

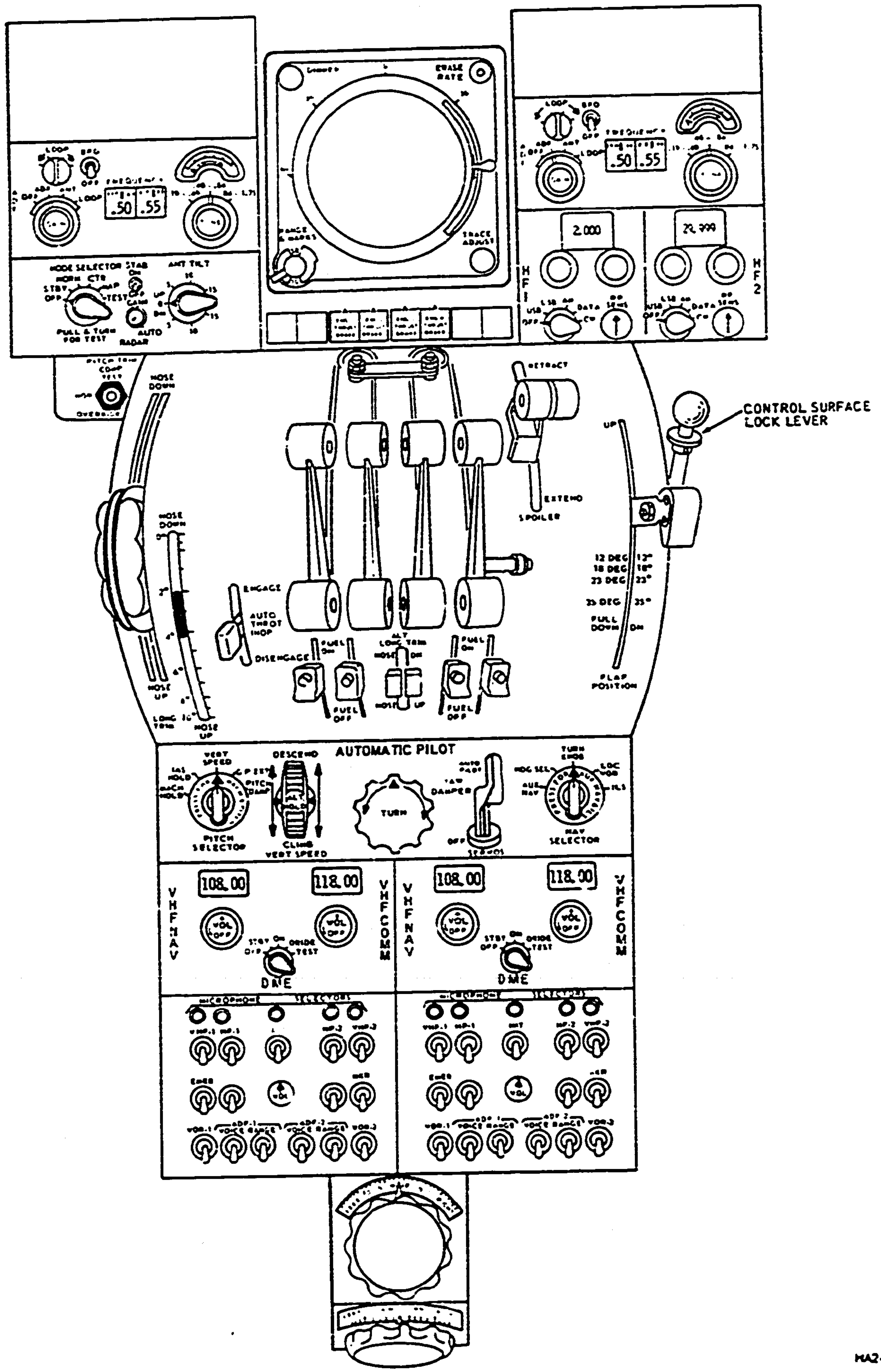
Printed in U.S.A.



A = AMBER LIGHT
* = INSTALLED ON N4869T

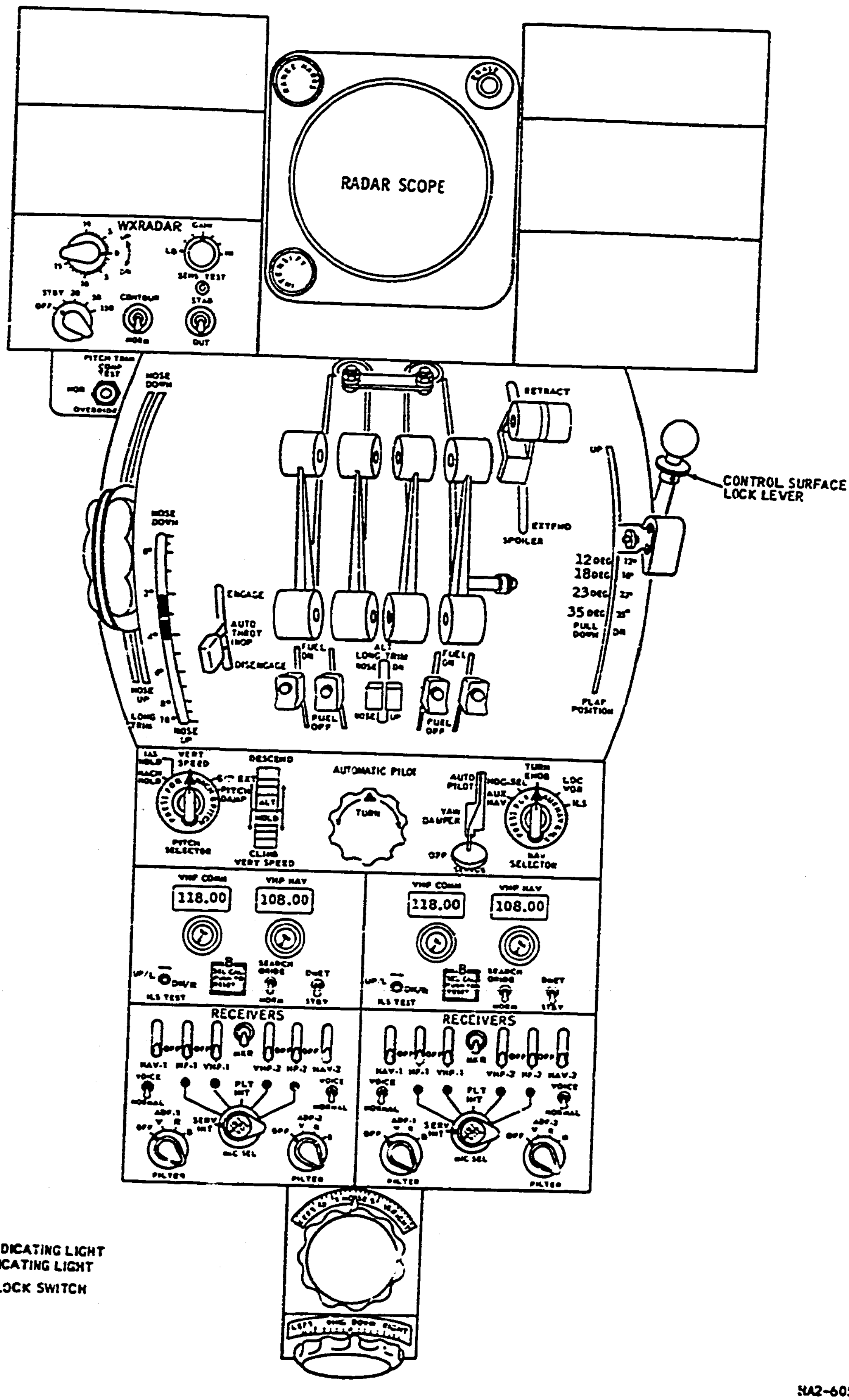
HA2-57638

Pilots' Control Pedestal
Figure 1



HA2-5778

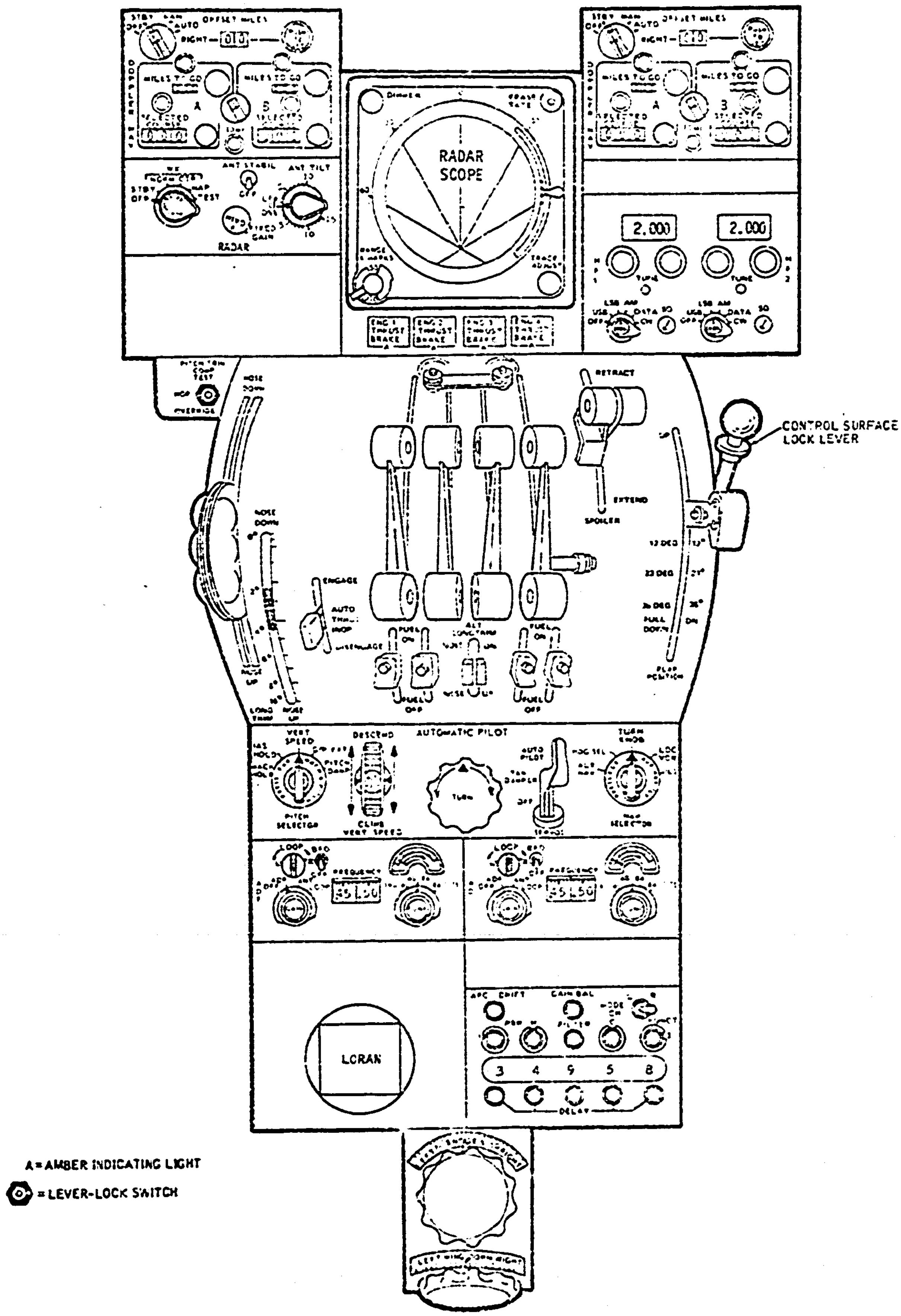
Pilots' Control Pedestal
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
⊙ = LEVER-LOCK SWITCH

HA2-6053

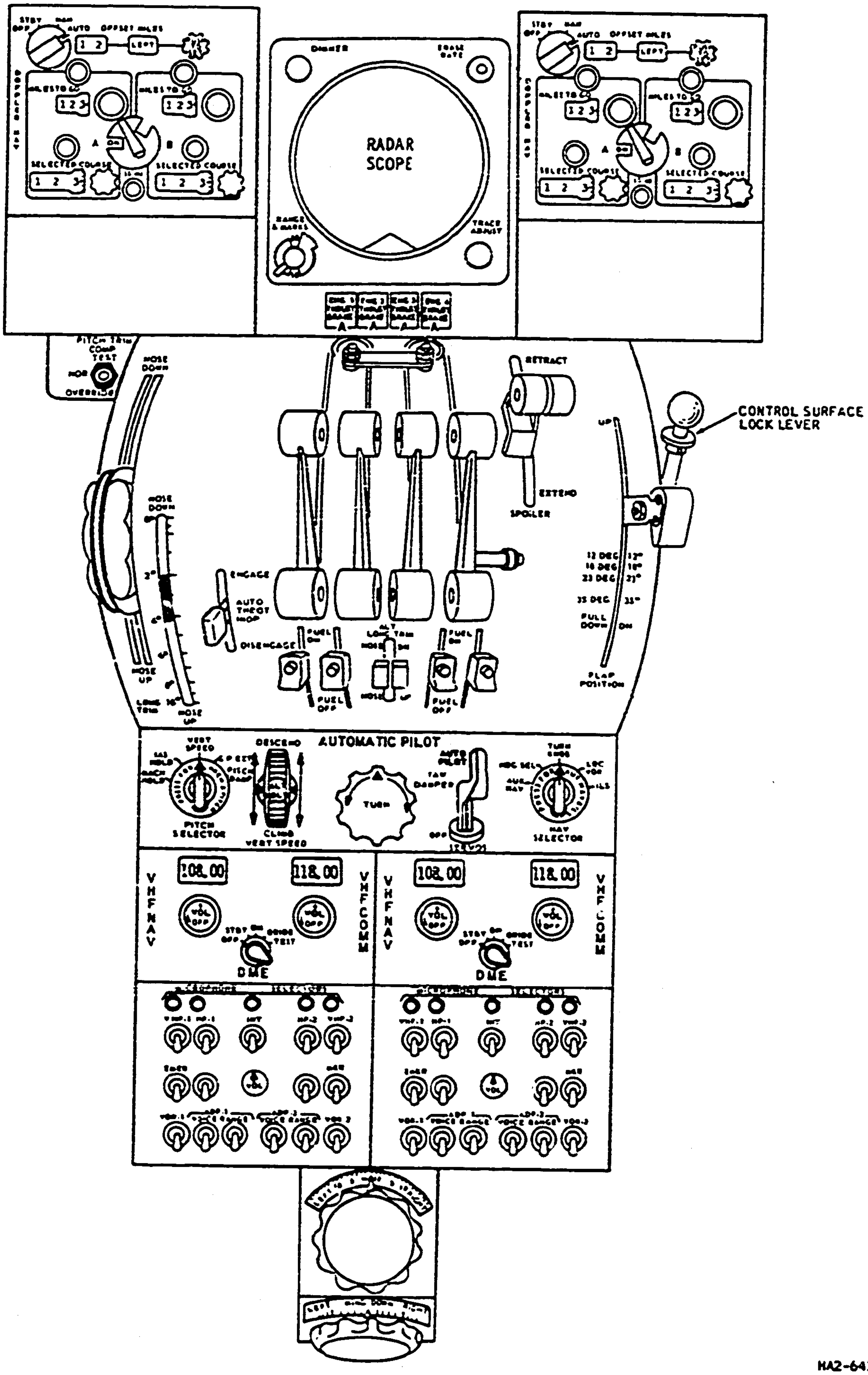
Pilots' Control Pedestal
Figure 1



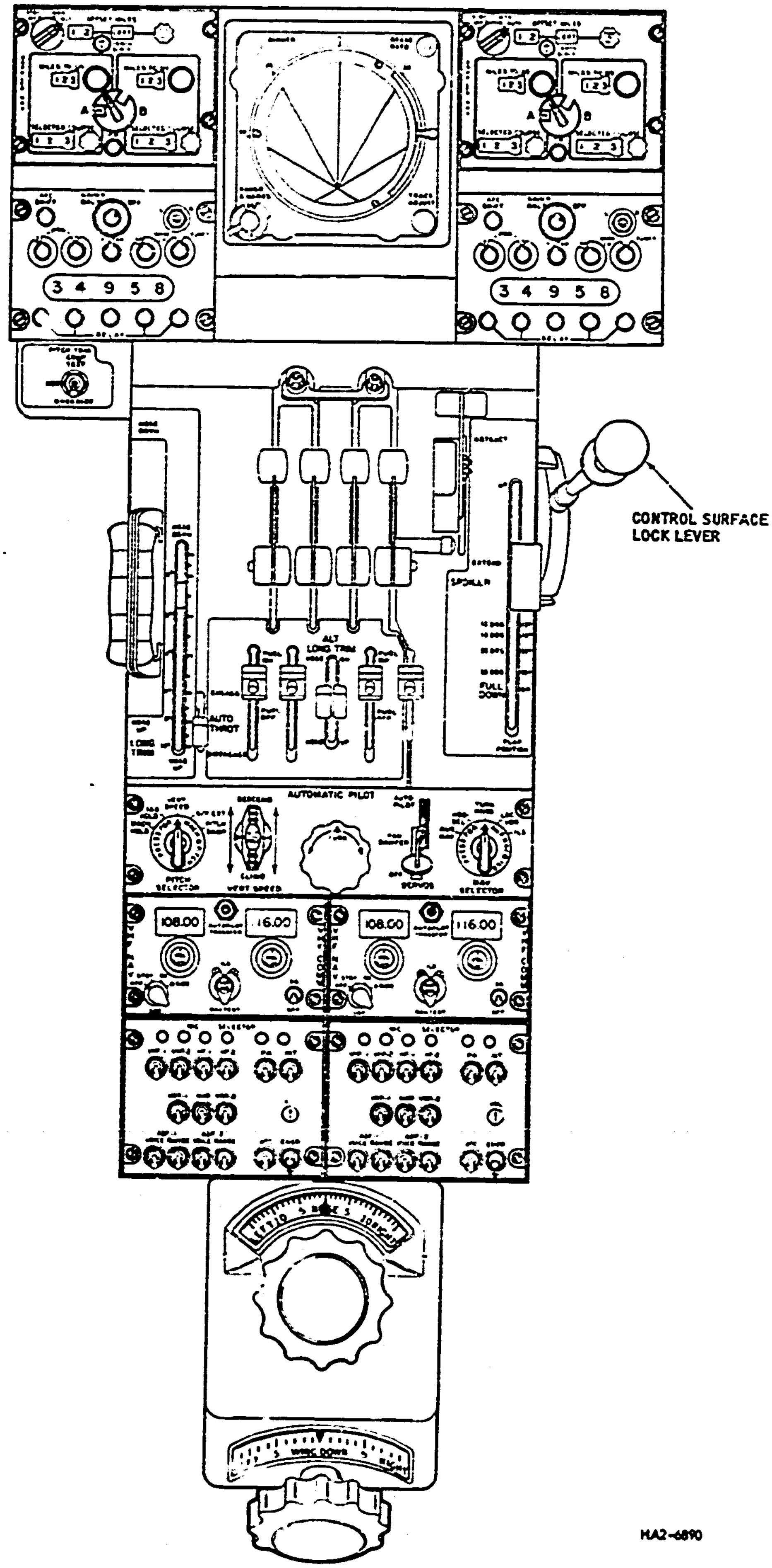
HA2-6402B

Pilots' Control Pedestal
Figure 1

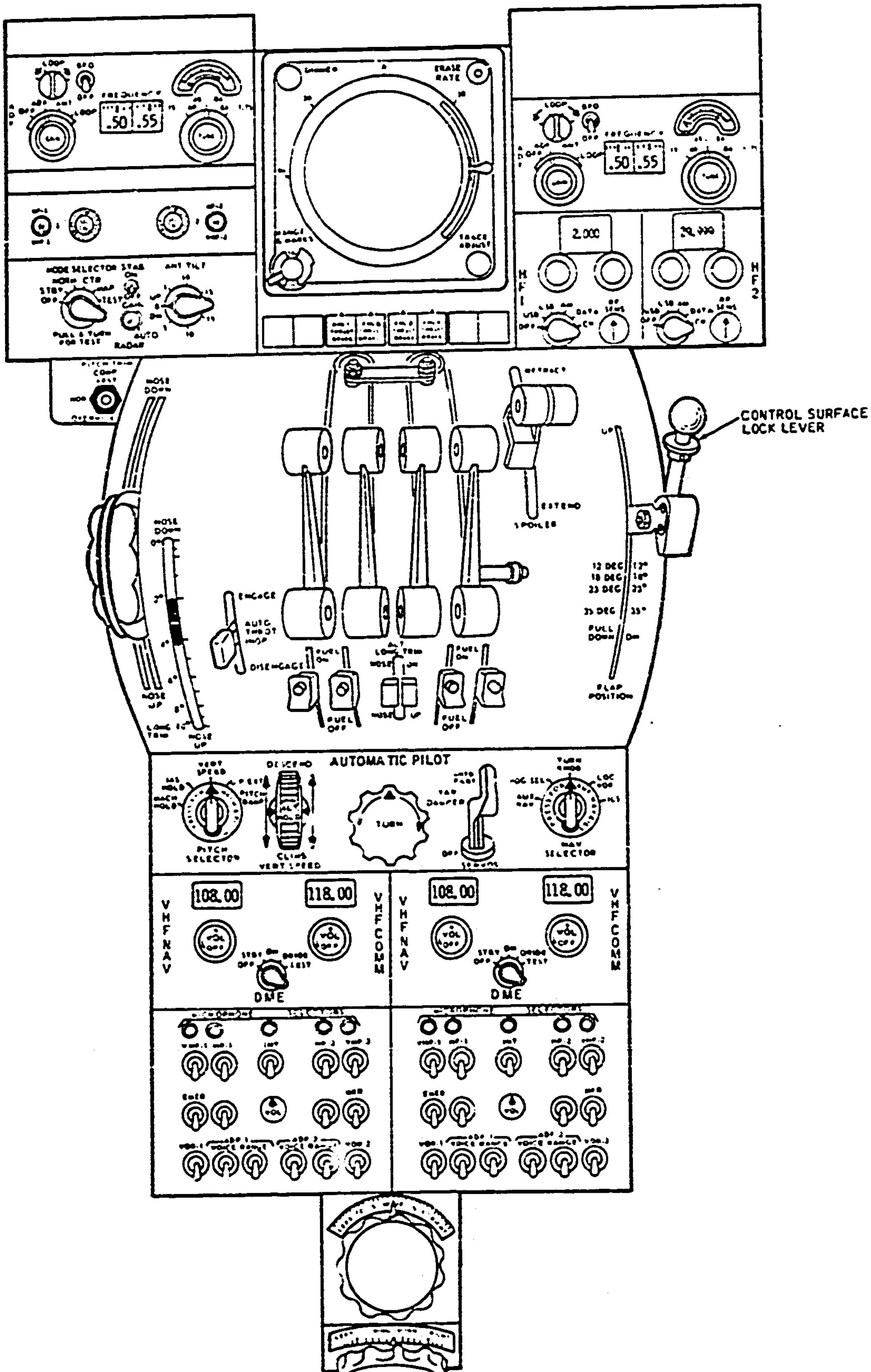
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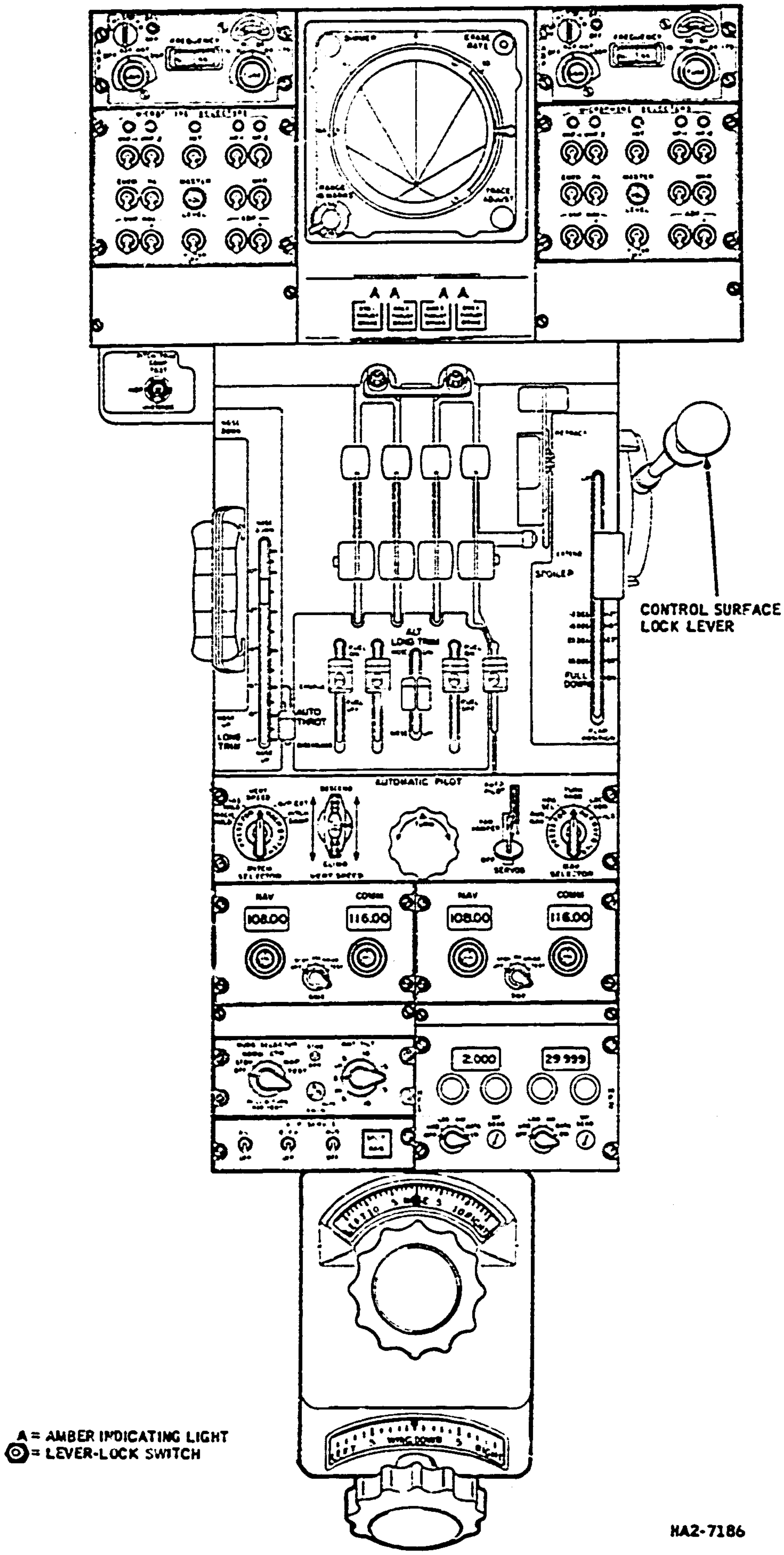
Pilots' Control Pedestal
Figure 1



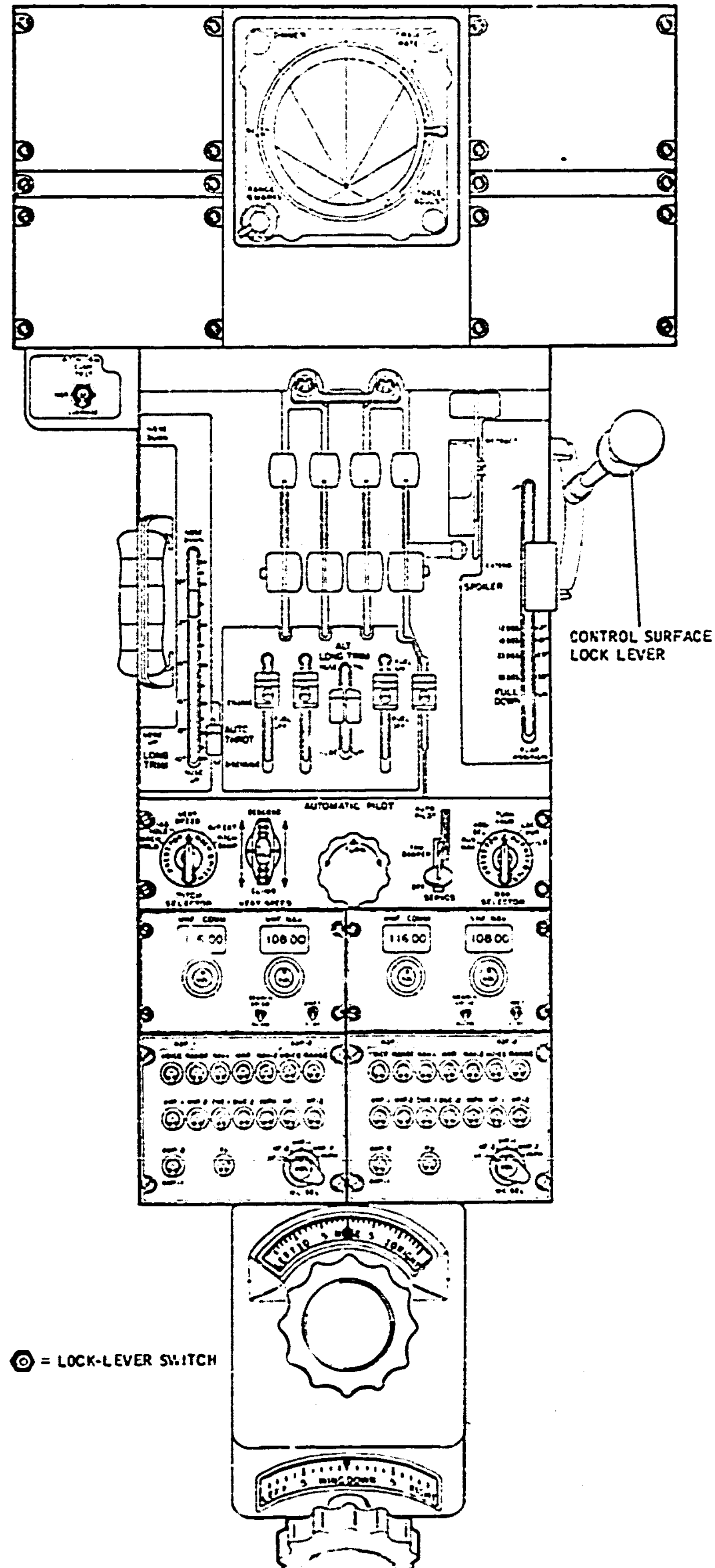
Pilots' Control Pedestal
Figure 1



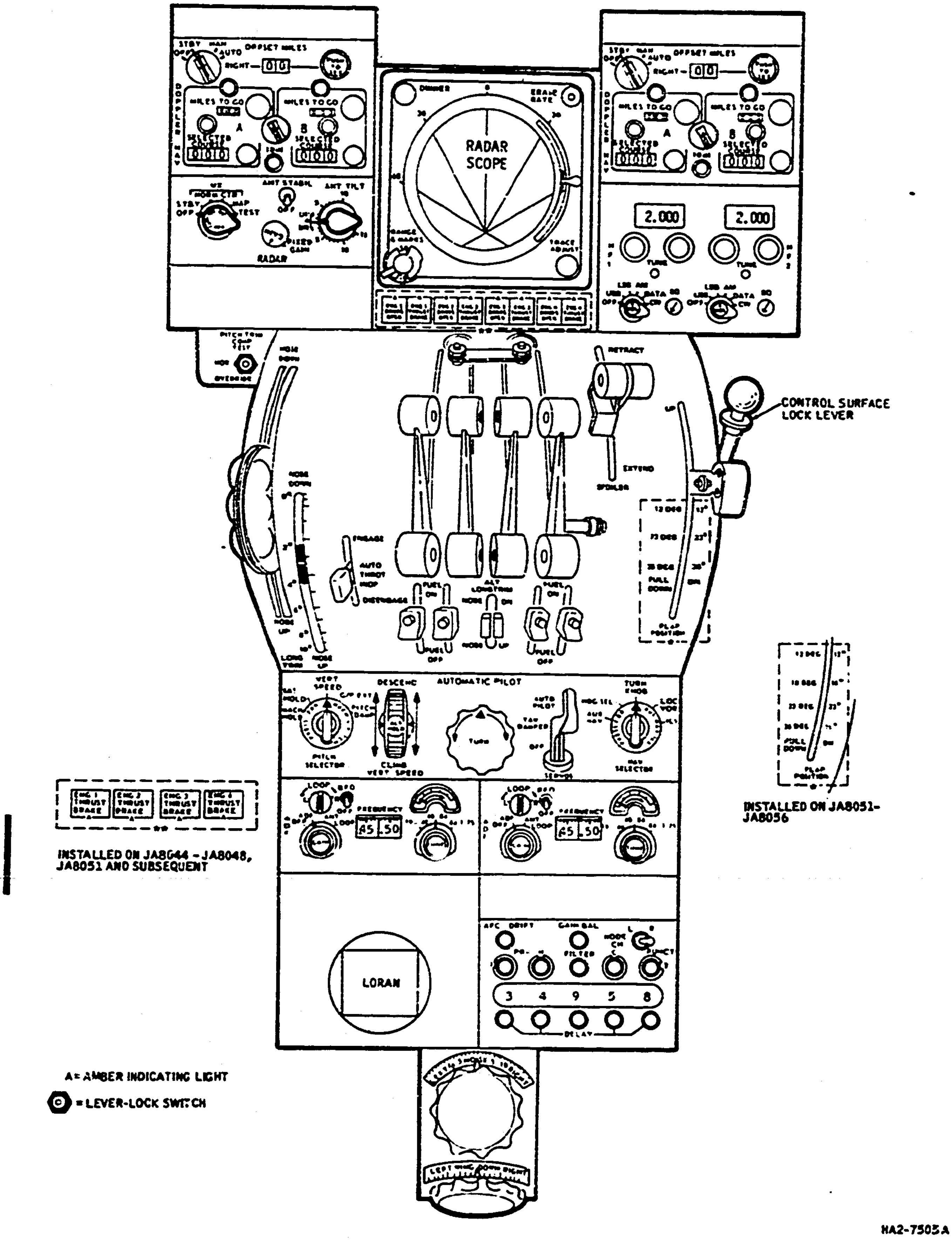
Pilots' Control Pedestal
Figure 1



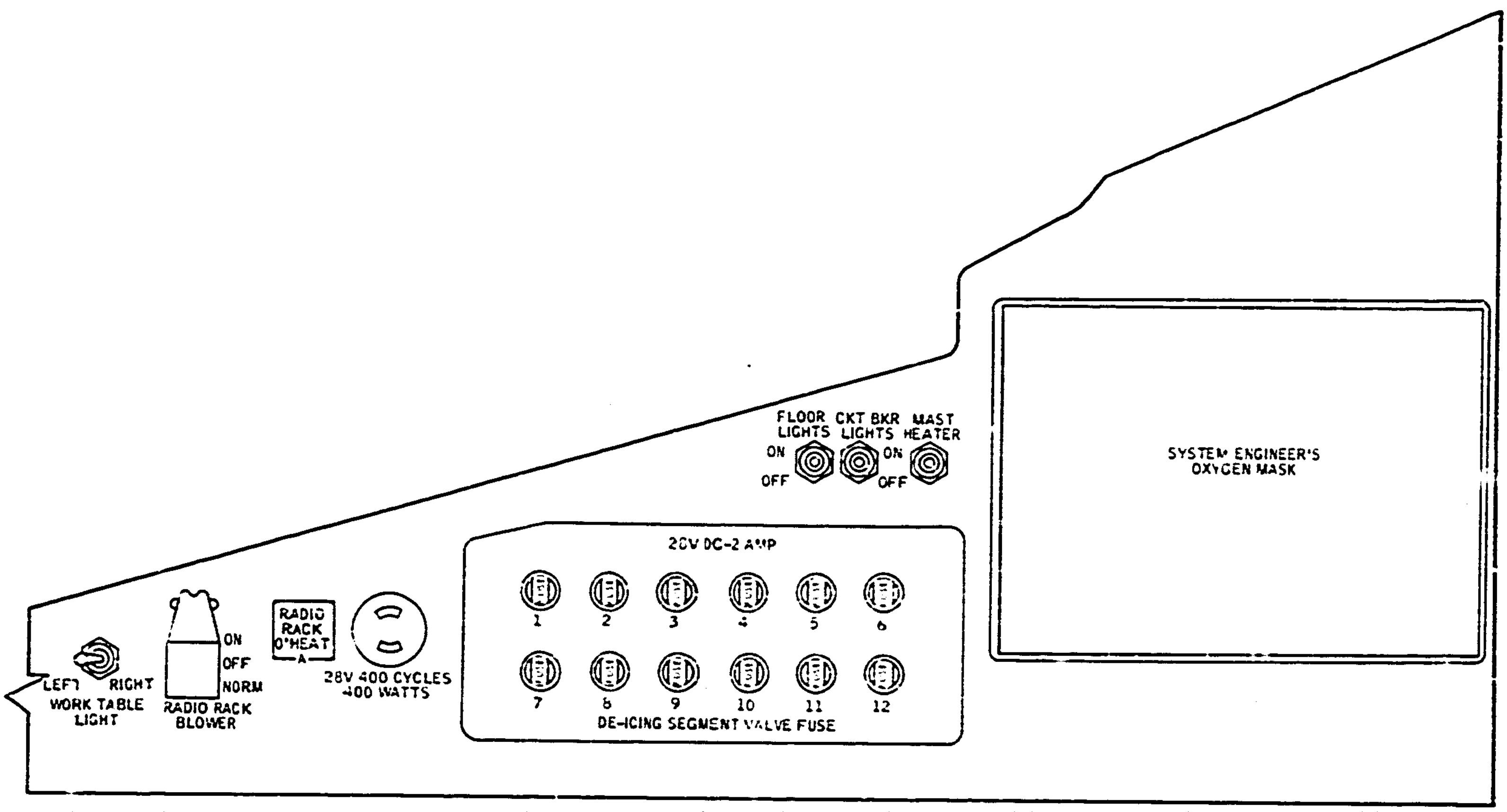
Pilots' Control Pedestal
Figure 1



Pilots' Control Pedestal
Figure 1



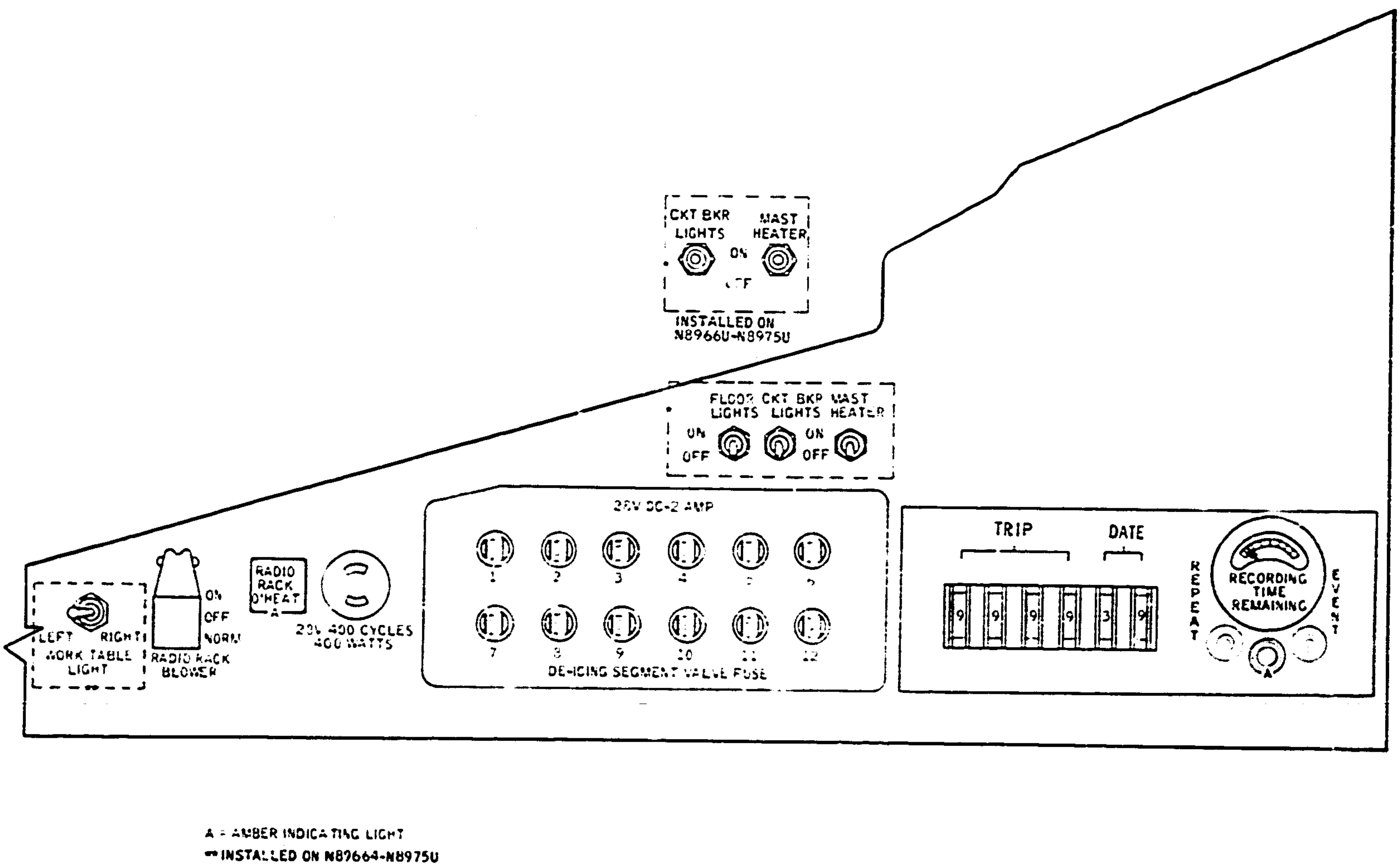
Pilots' Control Pedestal
Figure 1



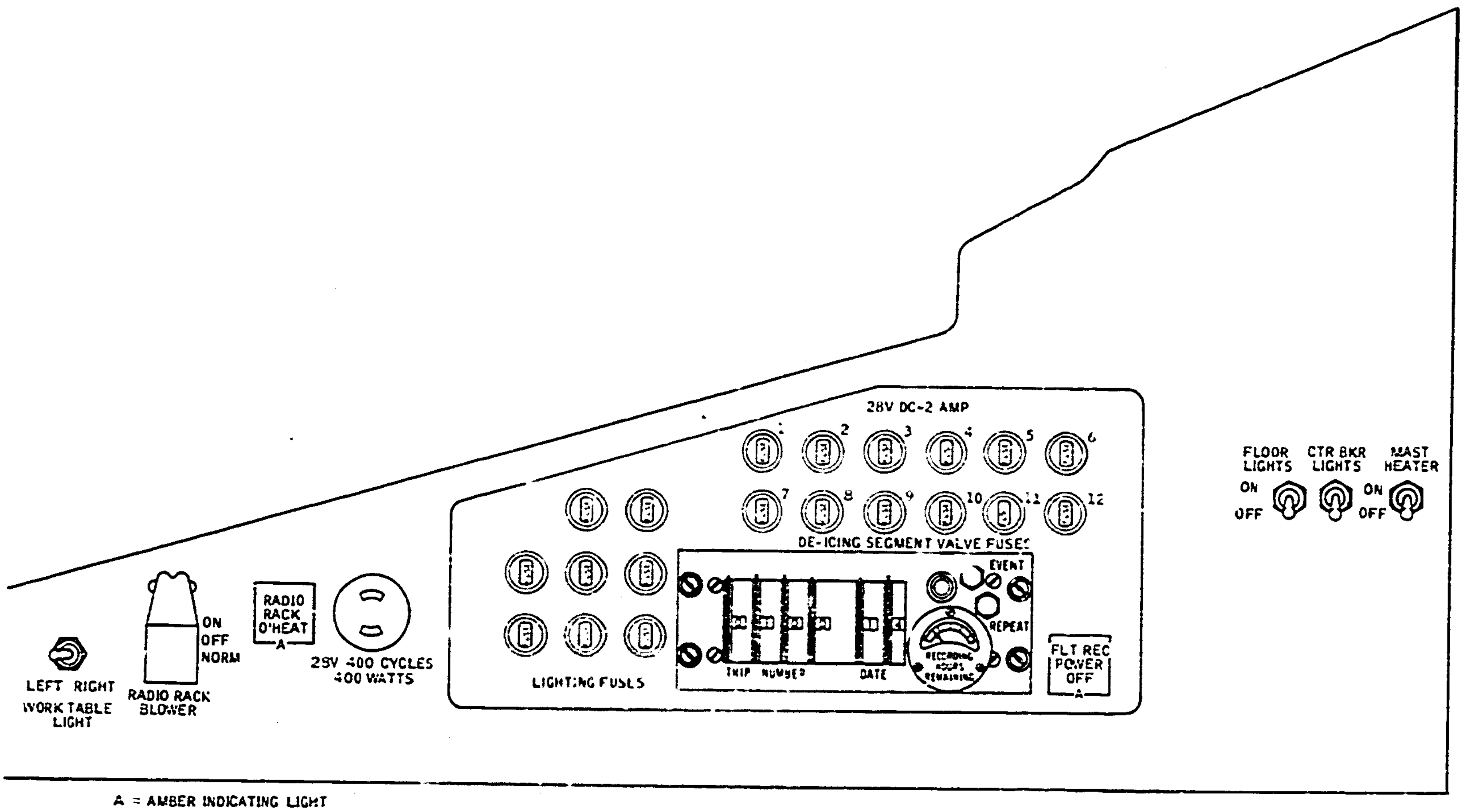
A = AMBER INDICATING LIGHT

HA2-1215A

Systems Engineer's Upper Frame
Figure 1

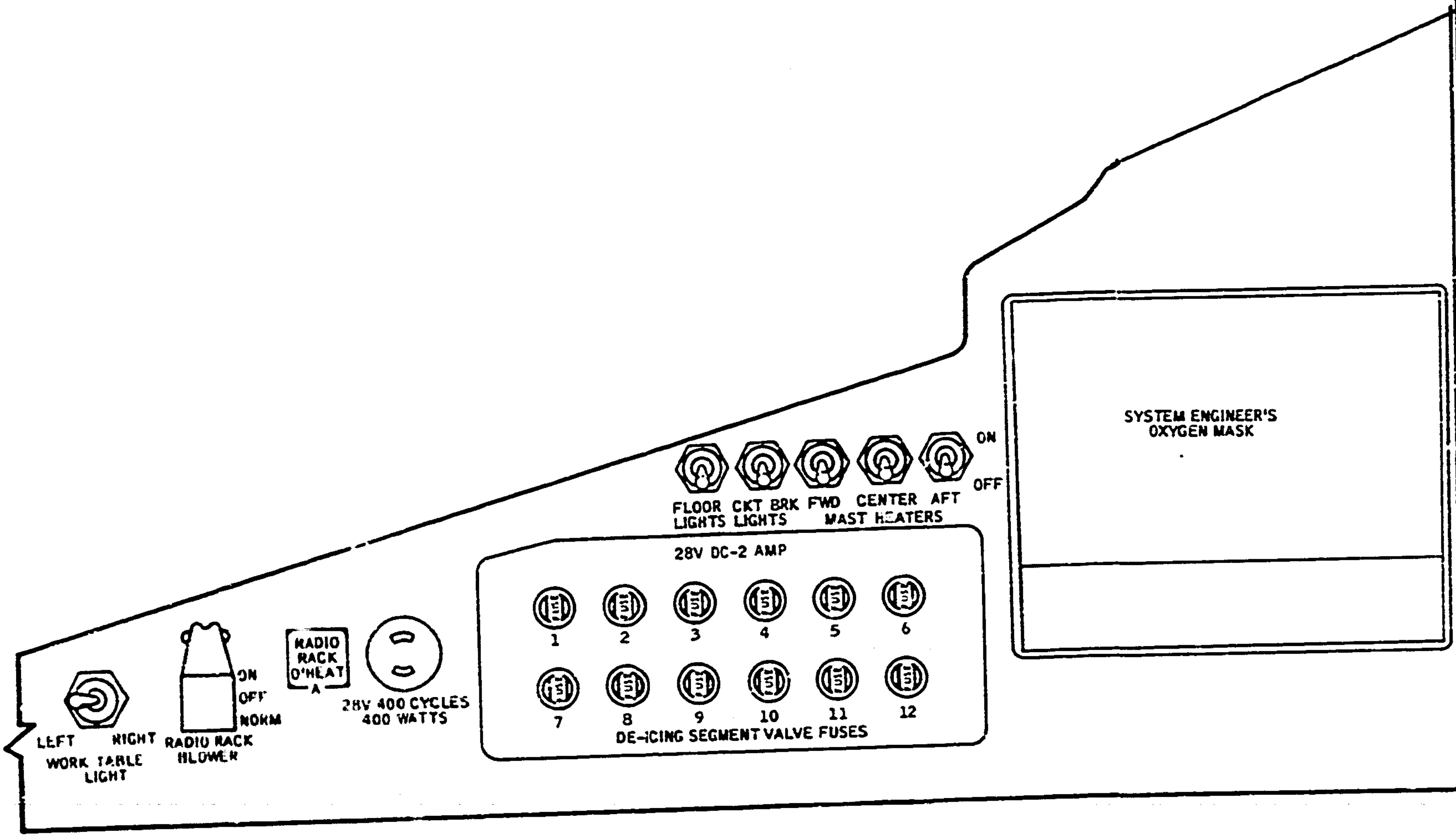


Systems Engineer's Control Panel (Upper Frame)
Figure 1



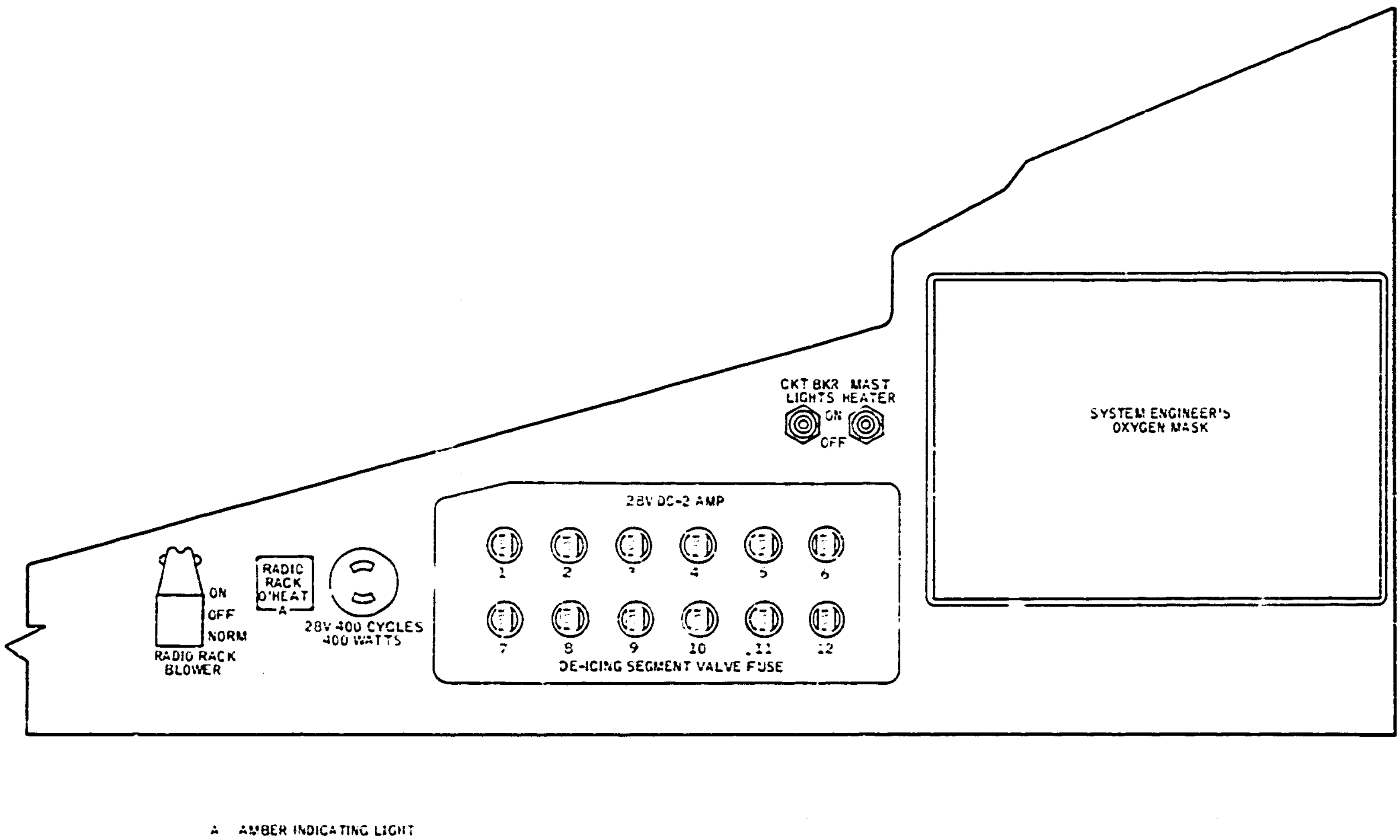
HA2-3054A

Systems Engineer's Upper Frame
Figure 1



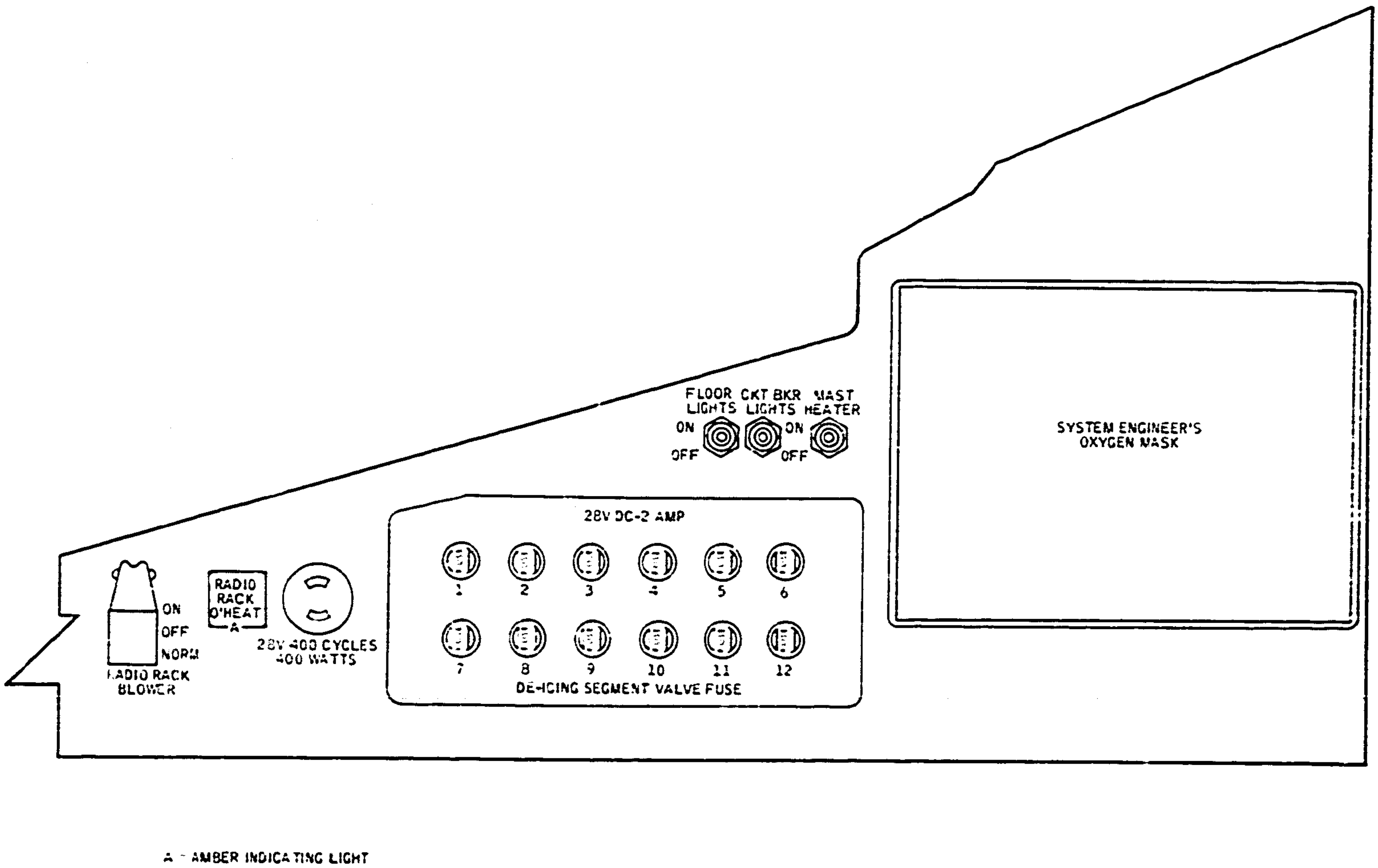
A - AMBER INDICATING LIGHT

Systems Engineer's Control Panel (Upper Frame)
Figure 1

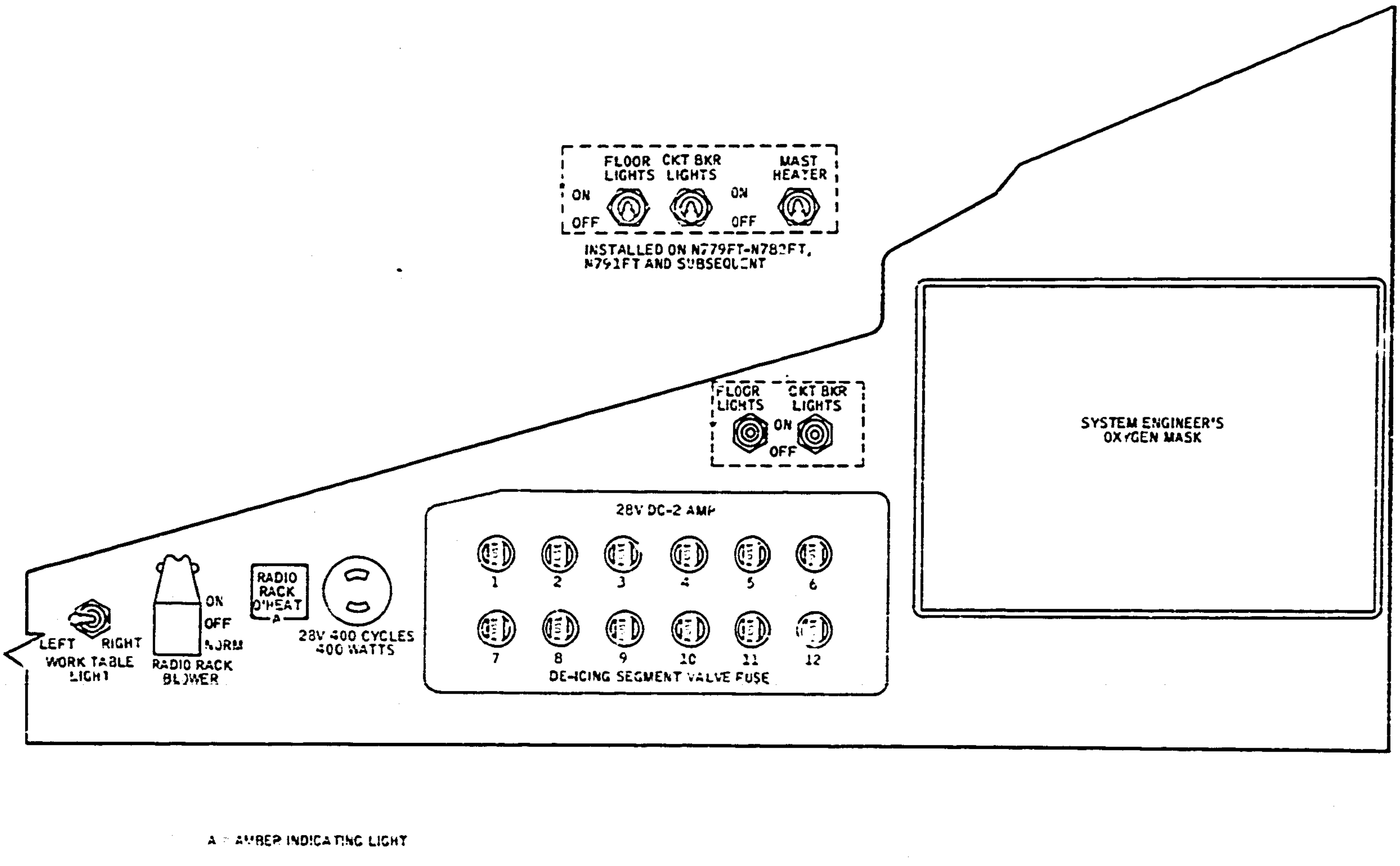


Systems Engineer's Upper Frame
Figure 1

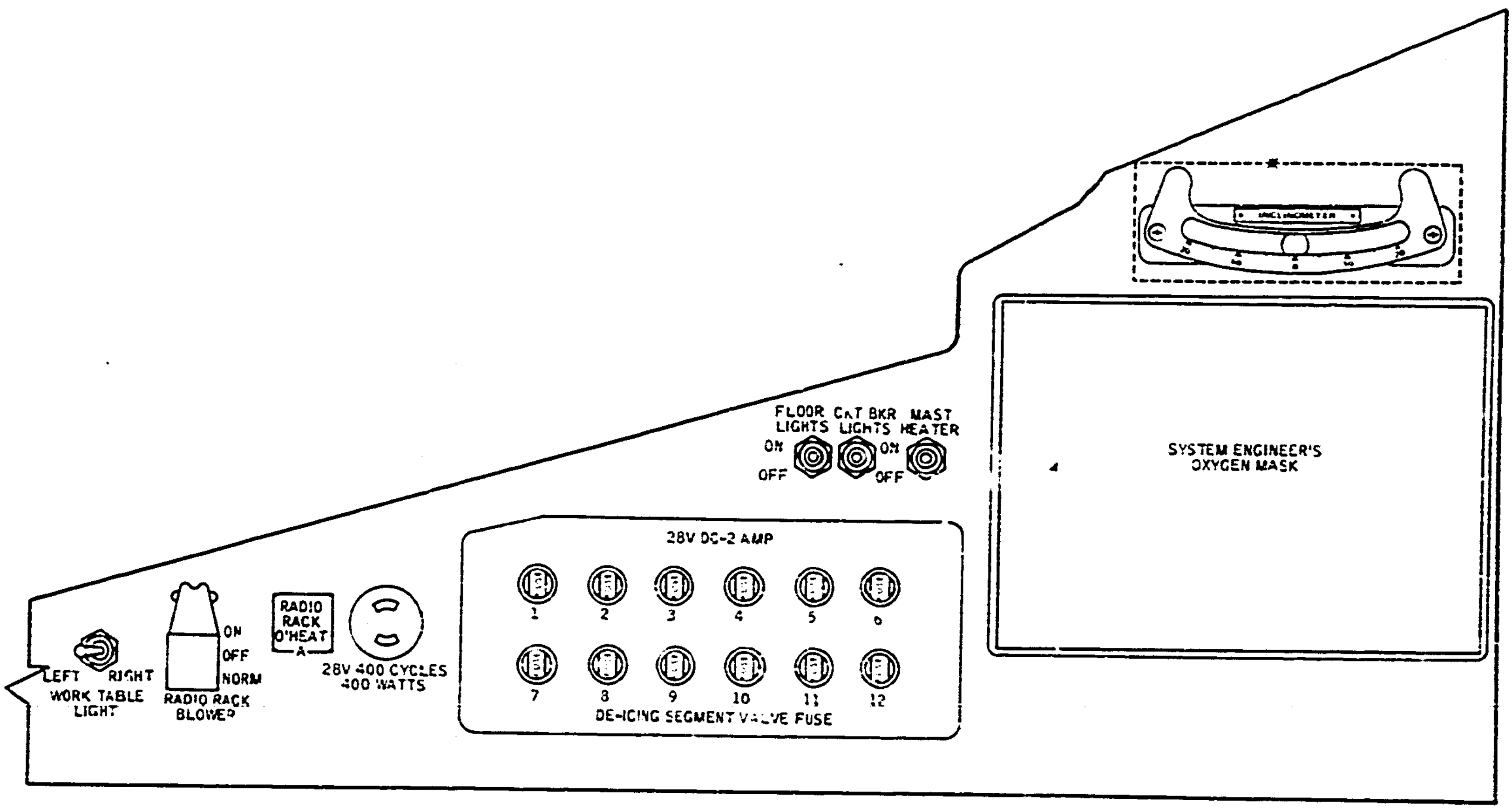
Printed in U.S.A.



Systems Engineer's Upper Frame
Figure 1



Systems Engineer's Control Panel (Upper Frame)
Figure 1

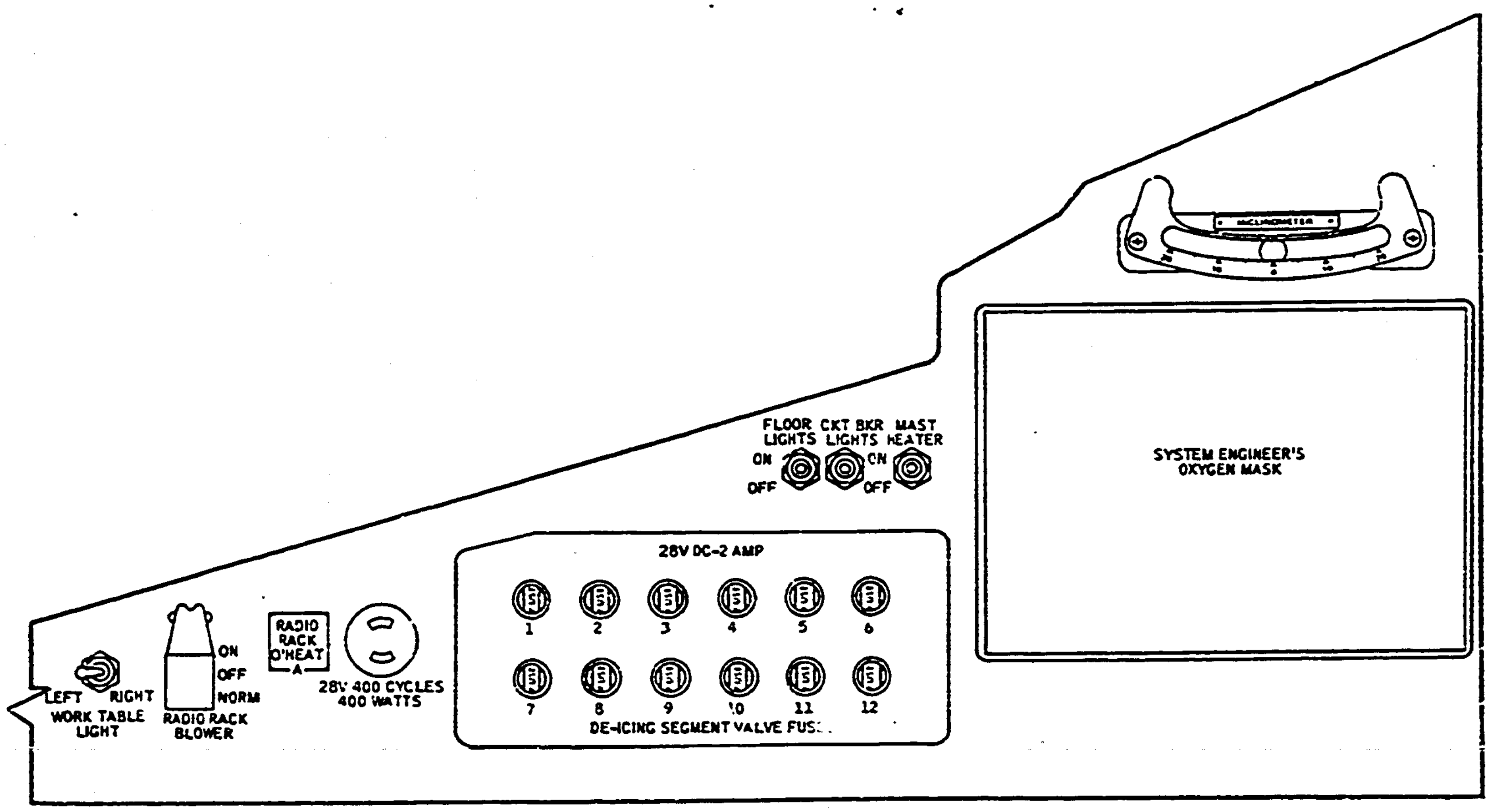


A = AMBER INDICATING LIGHT

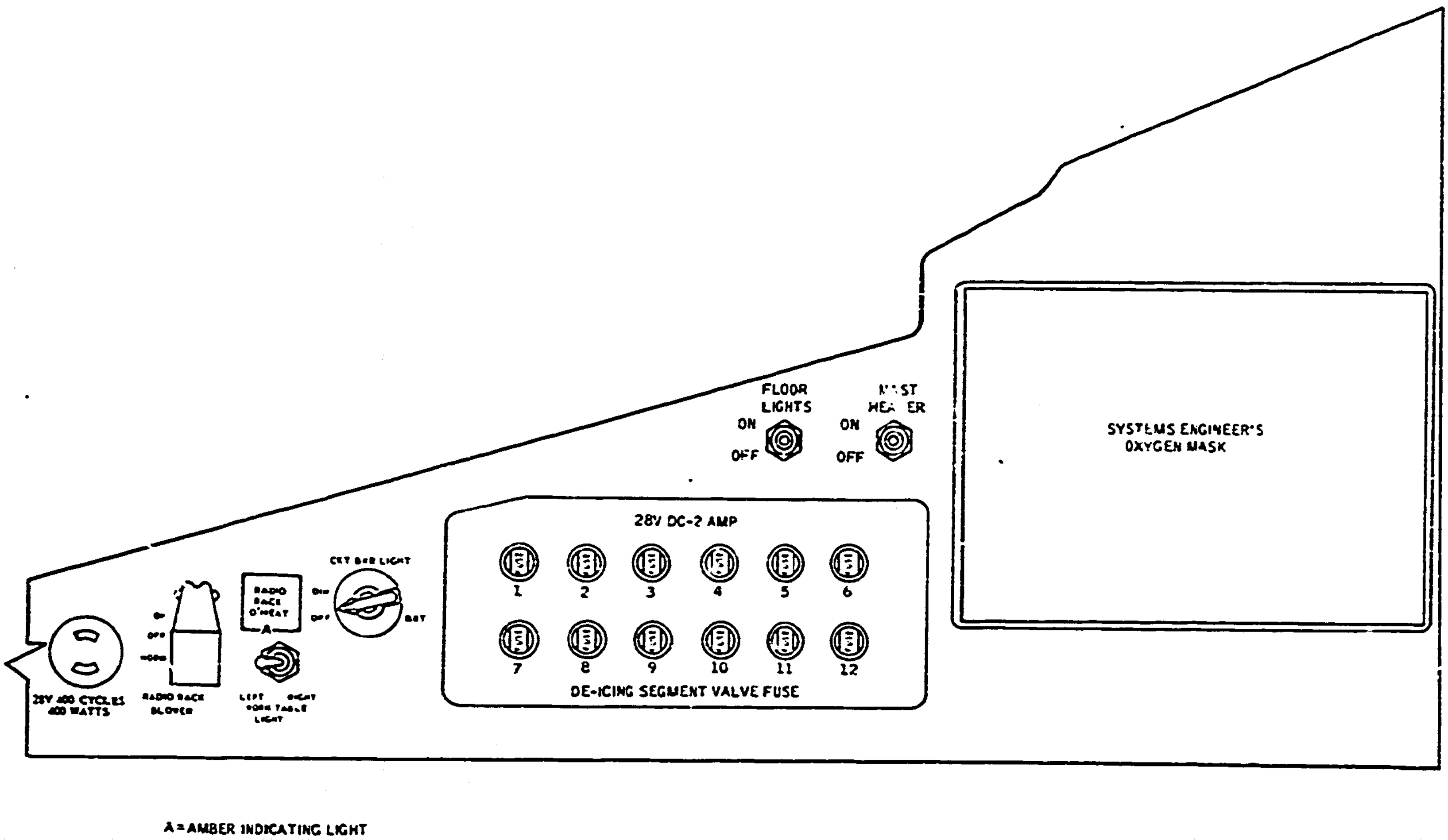
* NOT INSTALLED ON N8631-N8634

HA2-6400

Systems Engineer's Control Panel (Upper Frame)
Figure 1

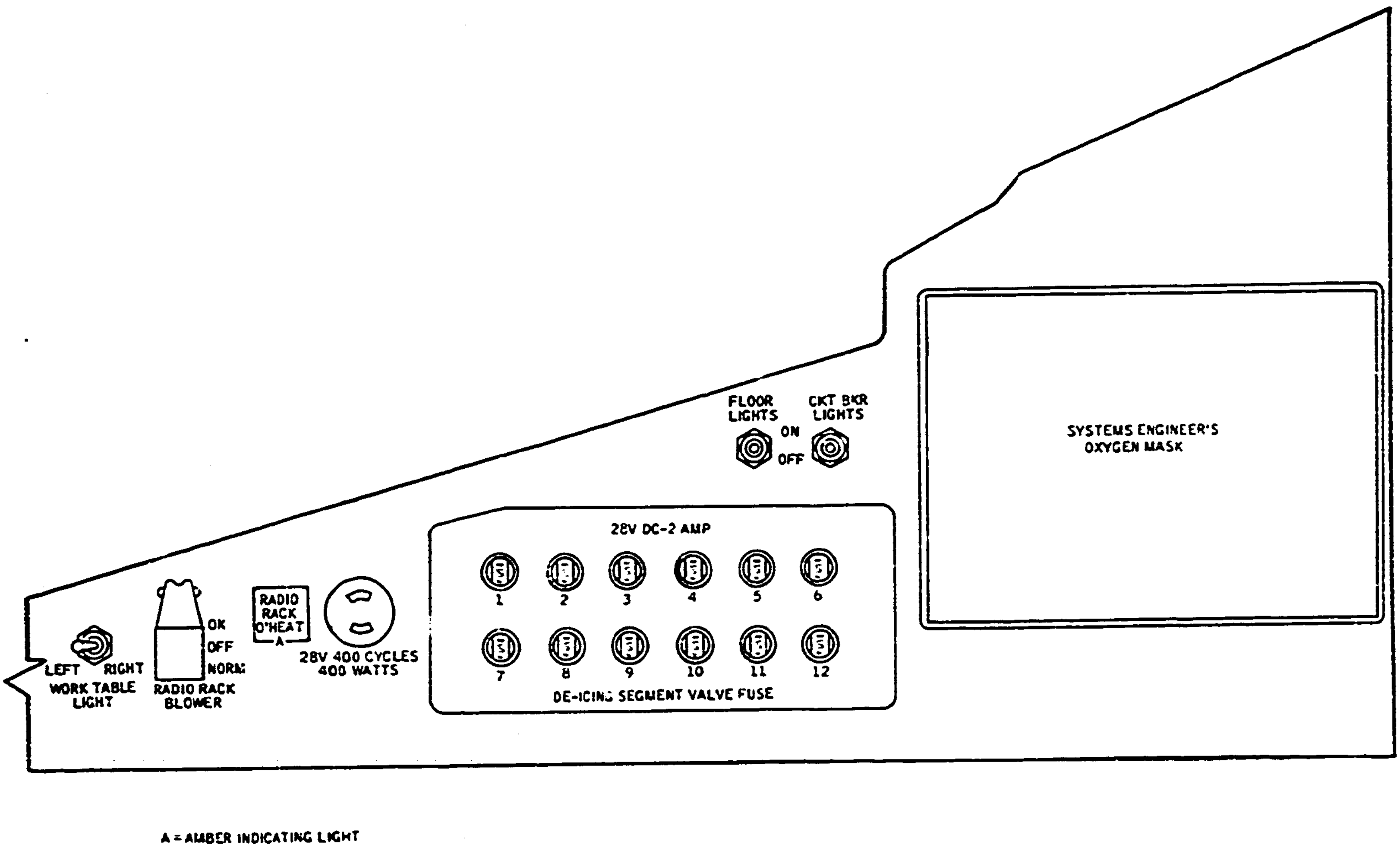


Systems Engineer's Control Panel (Upper Frame)
Figure 1



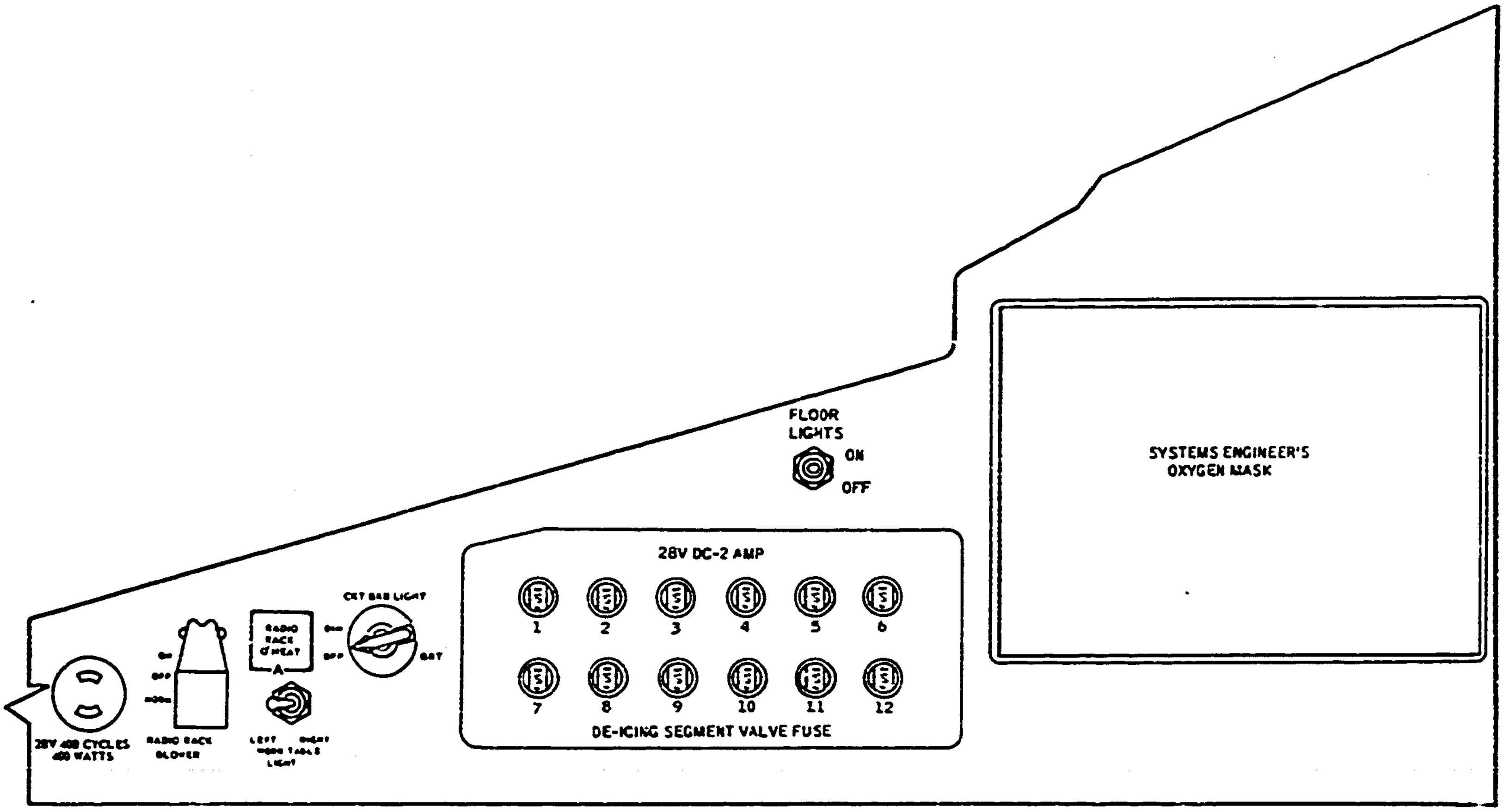
HA2-7341

Systems Engineer's Control Panel (Upper Frame)
Figure 1



HA2-7390

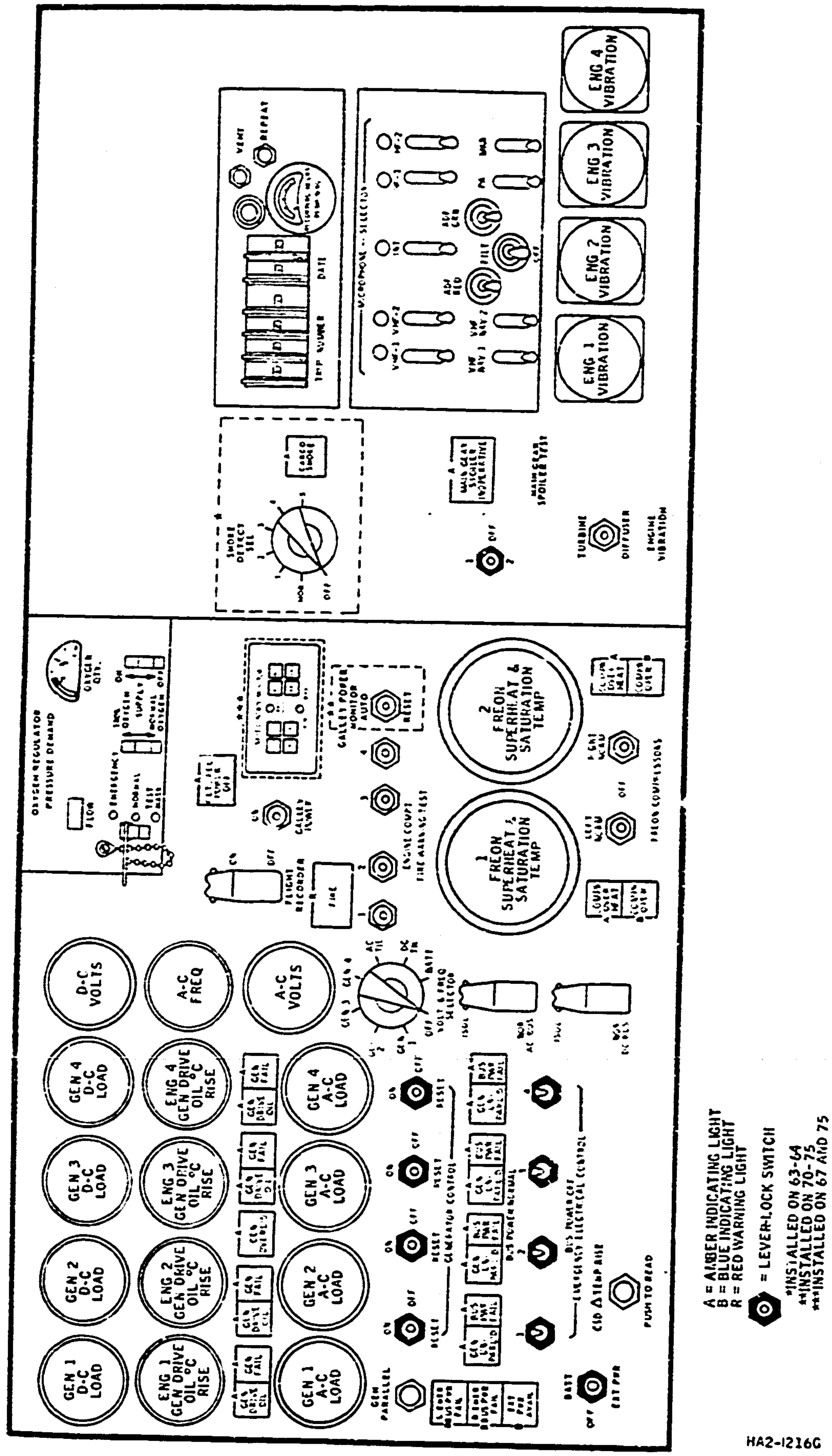
Systems Engineer's Control Panel (Upper Frame)
Figure 1



A = AMBER INDICATING LIGHT

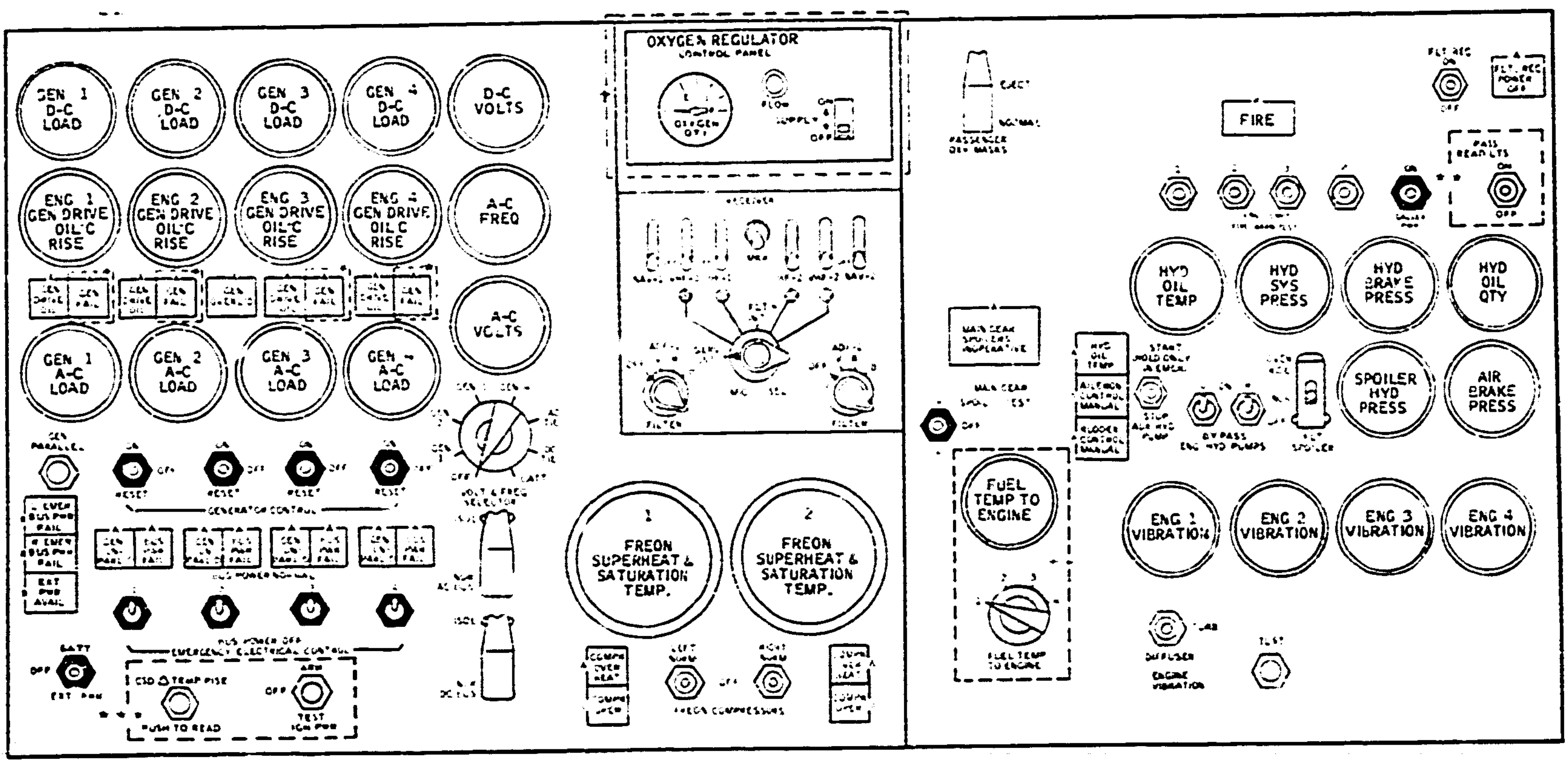
HA2-7391

Systems Engineer's Control Panel (Upper Frame)
Figure 1



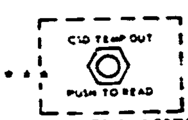
HA2-1216G

Systems Engineer's Control Panel (Upper Section)
Figure 1

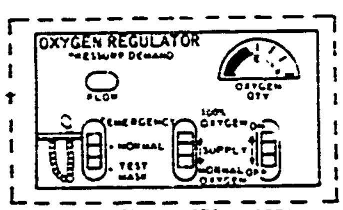


A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
= LEVER-LOCK SWITCH

* INSTALLED ON N8070U-N8076U
** INSTALLED ON N8966U-N8975U
* * INSTALLED ON N8070U-N8099U



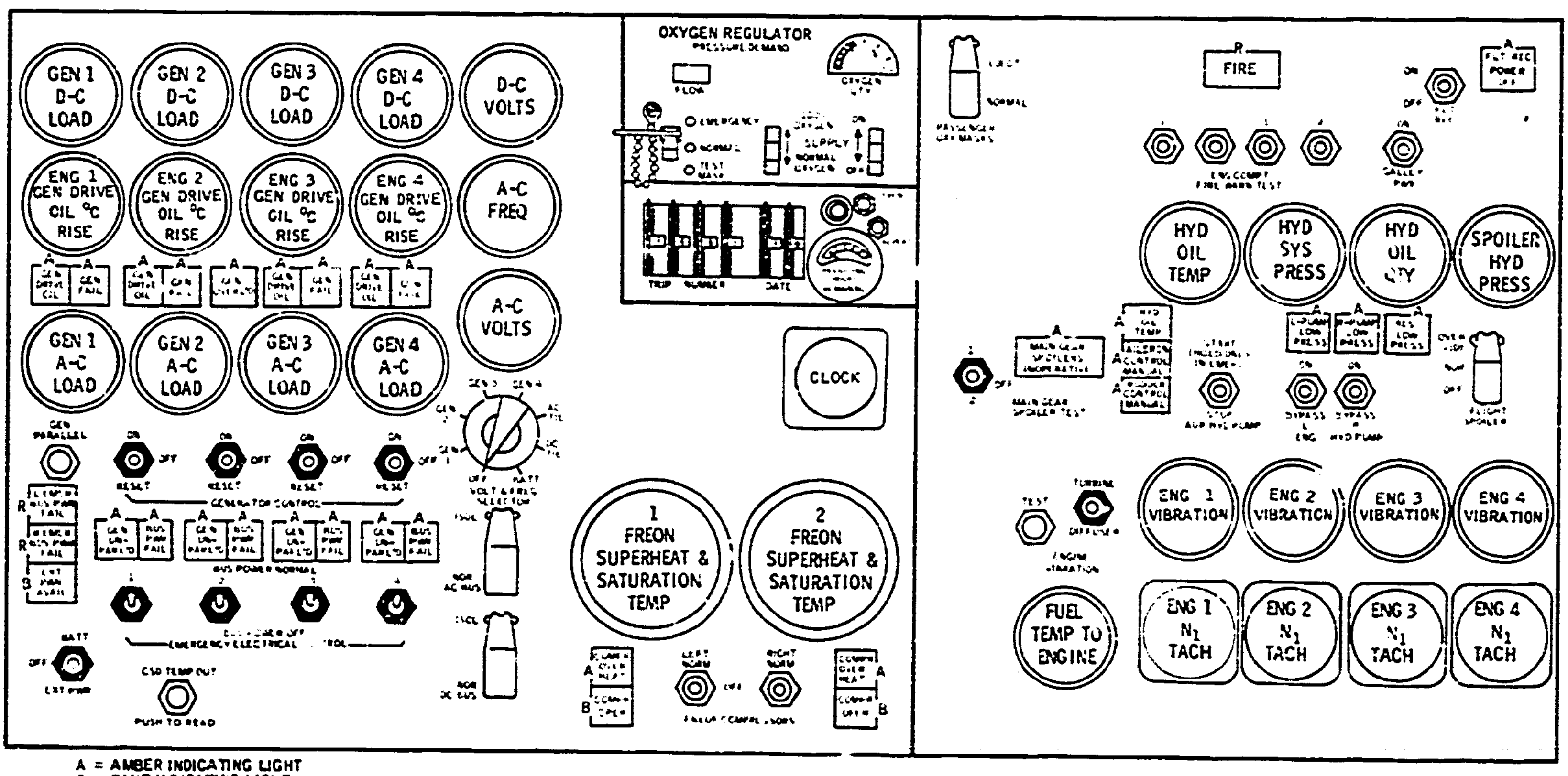
INSTALLED ON N8070U - N8099U



INSTALLED ON N8070U- N8076U

HA2-1258E

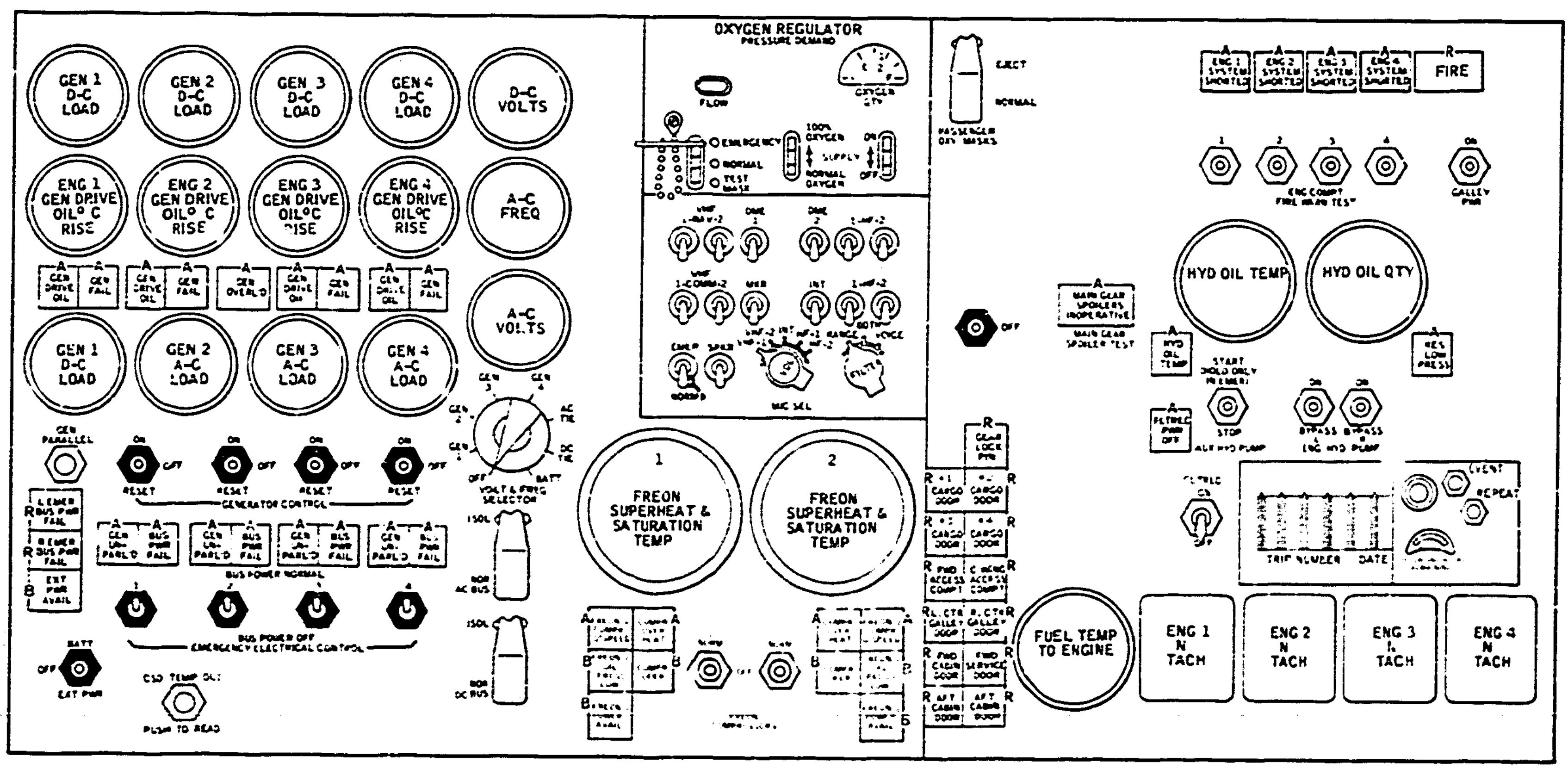
Systems Engineer's Control Panel (Upper Section)
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
= LEVER-LOCK SWITCH

HA2-133CA

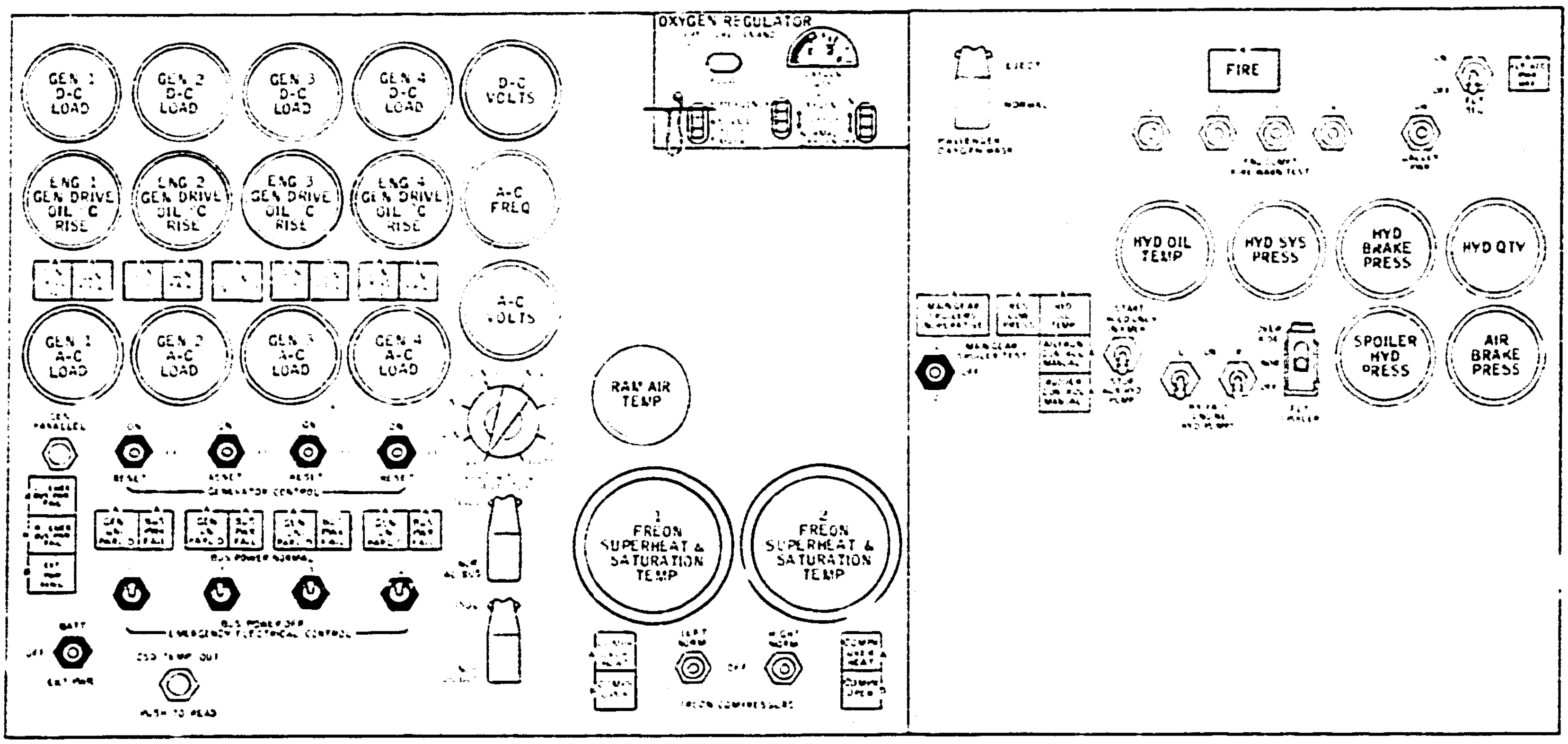
Systems Engineer's Control Panel (Upper Section)
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
⊙ = LEVER-LOCK SWITCH

1A2-2362

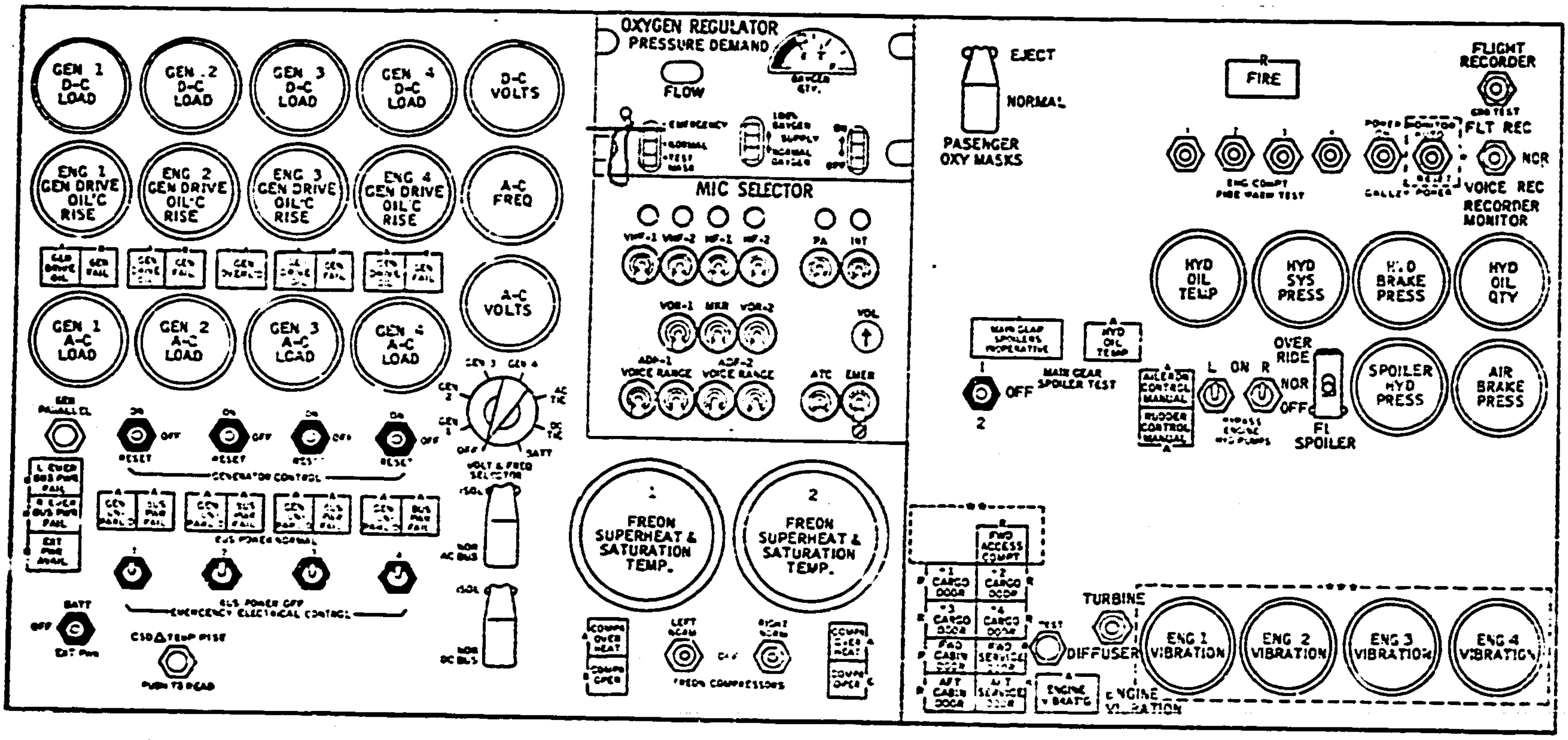
Systems Engineer's Control Panel (Upper Section)
Figure 1



A - AMBER INDICATING LIGHT
B - BLUE INDICATING LIGHT
R - RED WARNING LIGHT
LEVER-LOCK SWITCH

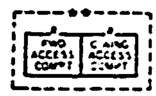
HA2-2971A

Systems Engineer's Control Panel (Upper Section)
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
= LEVER-LOCK SWITCH

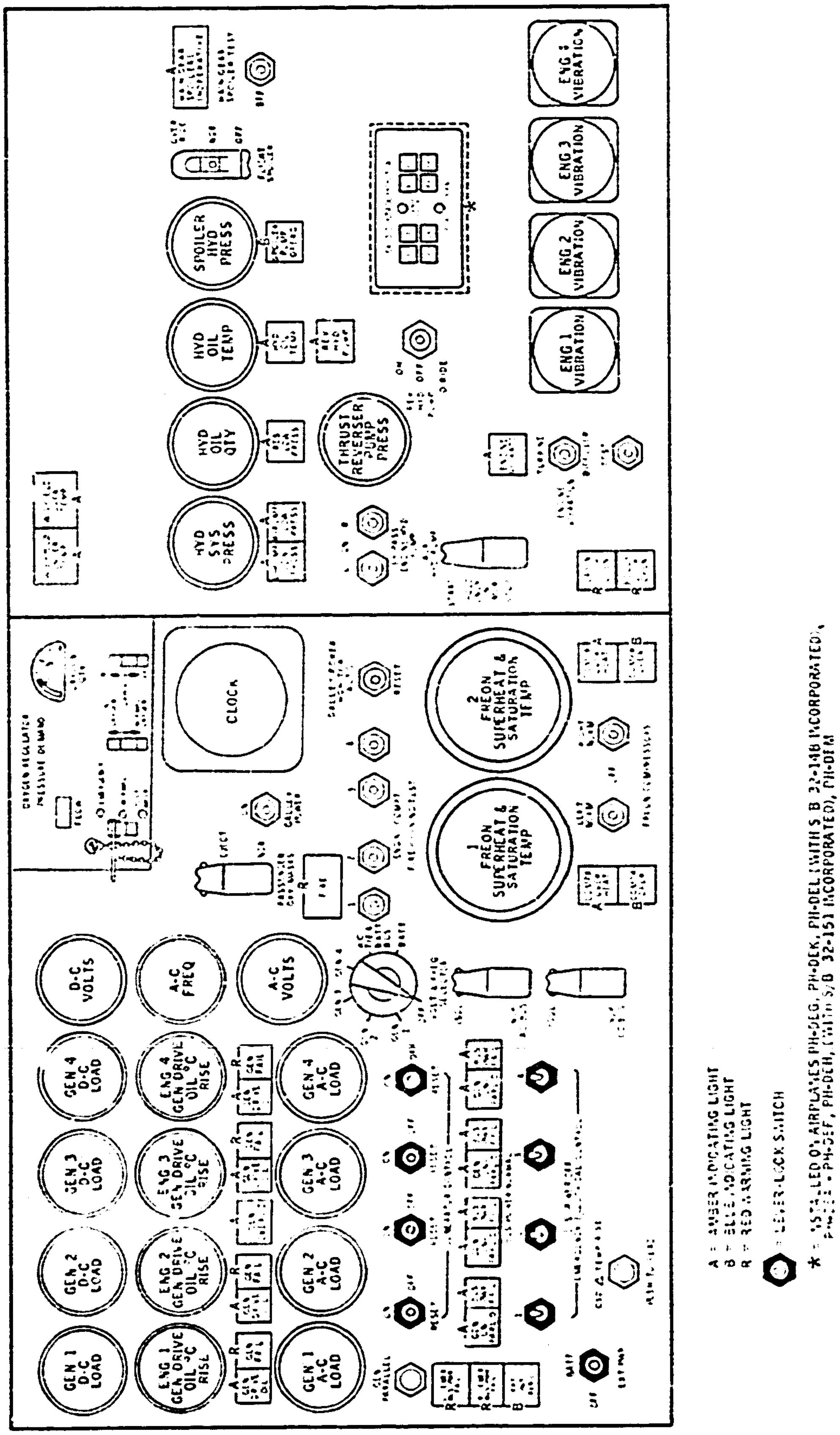
* NOT INSTALLED ON N1803-N1806
*** NOT INSTALLED ON N1803 - N1806



INSTALLED ON N1508E-N1509E

HA2-29729

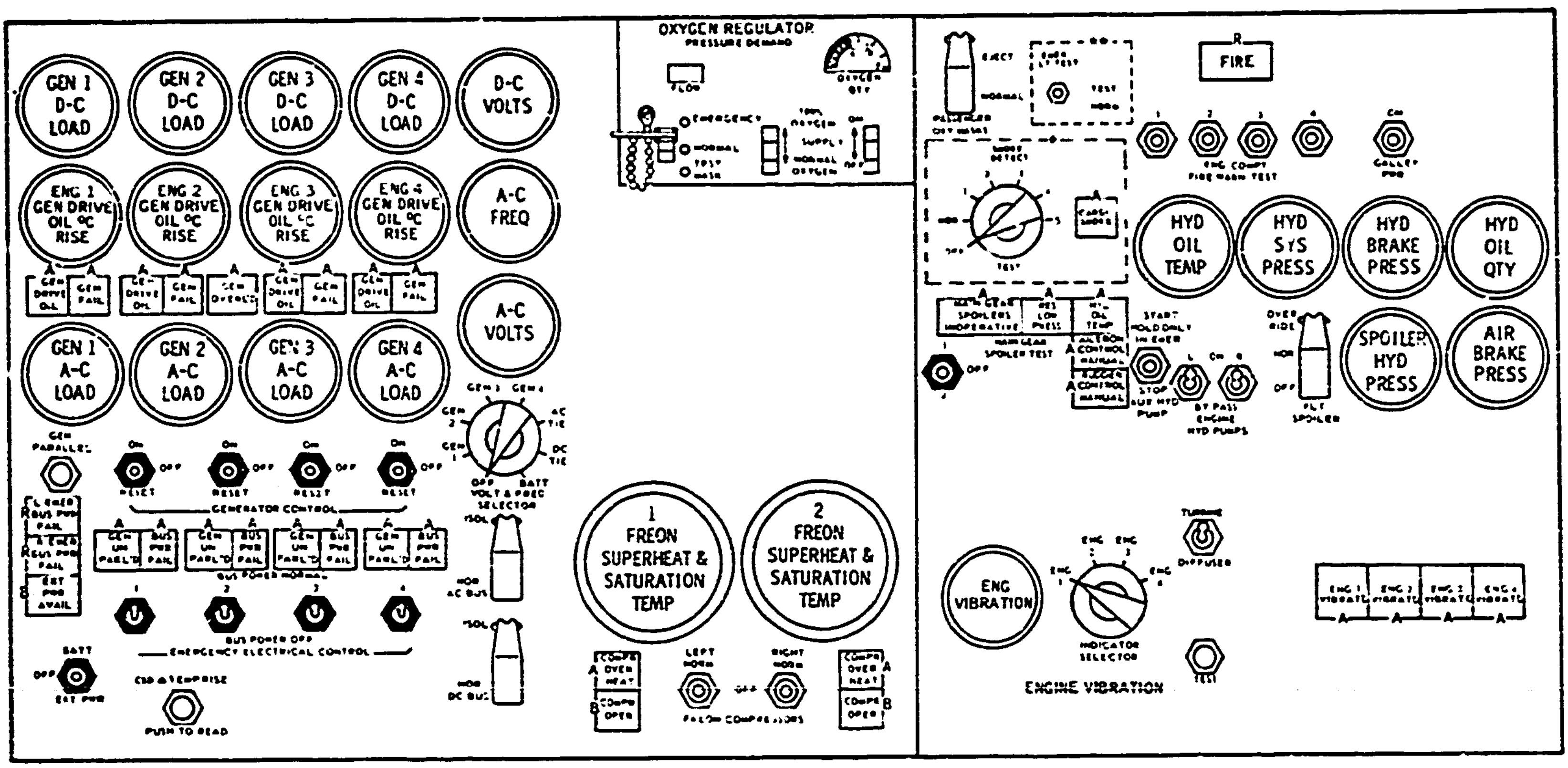
Systems Engineer's Control Panel (Upper Section)
Figure 1



HA2-3055H

Systems Engineer's Control Panel (Upper Section)
Figure 1

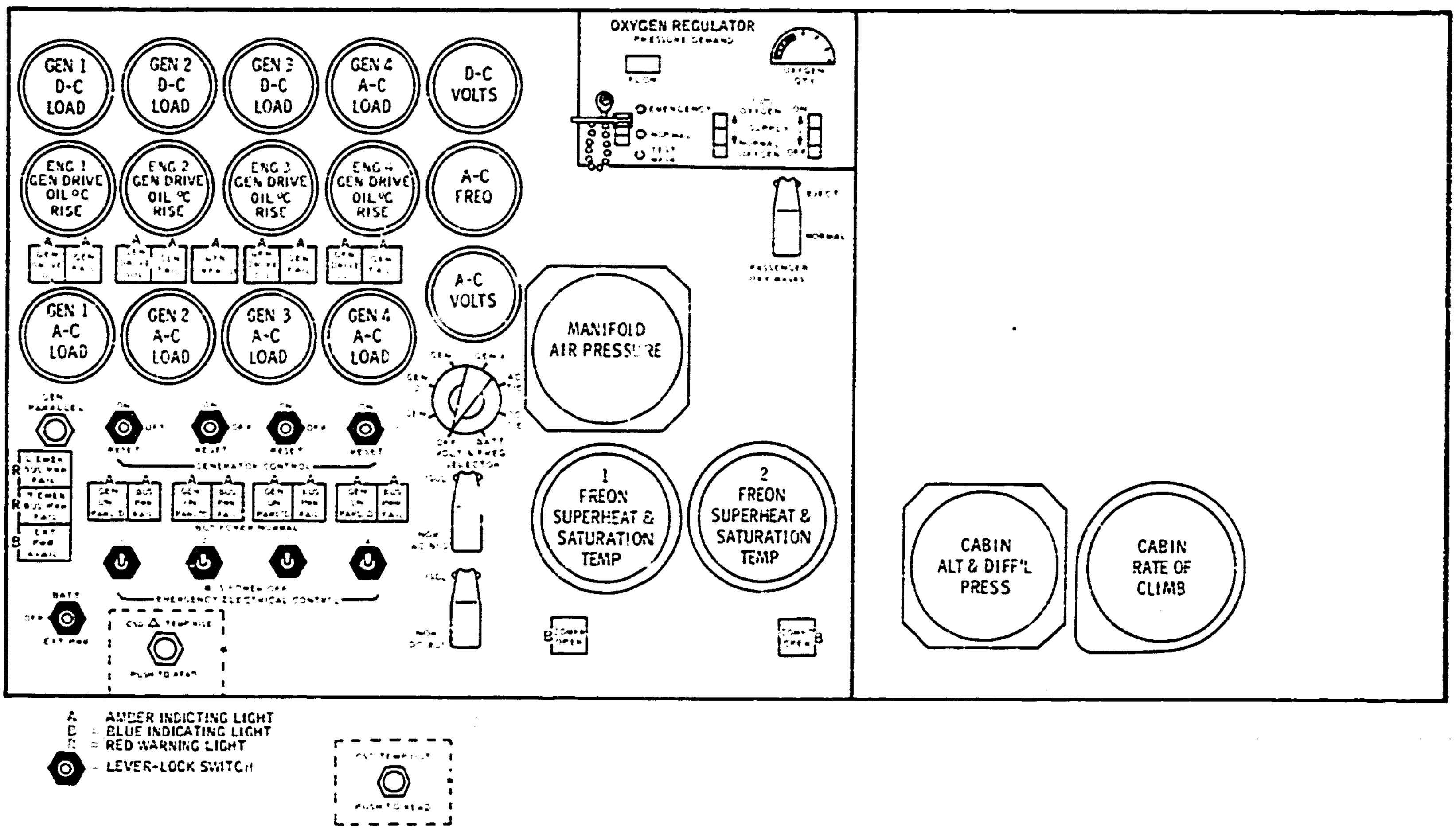
Printed in U.S.A.



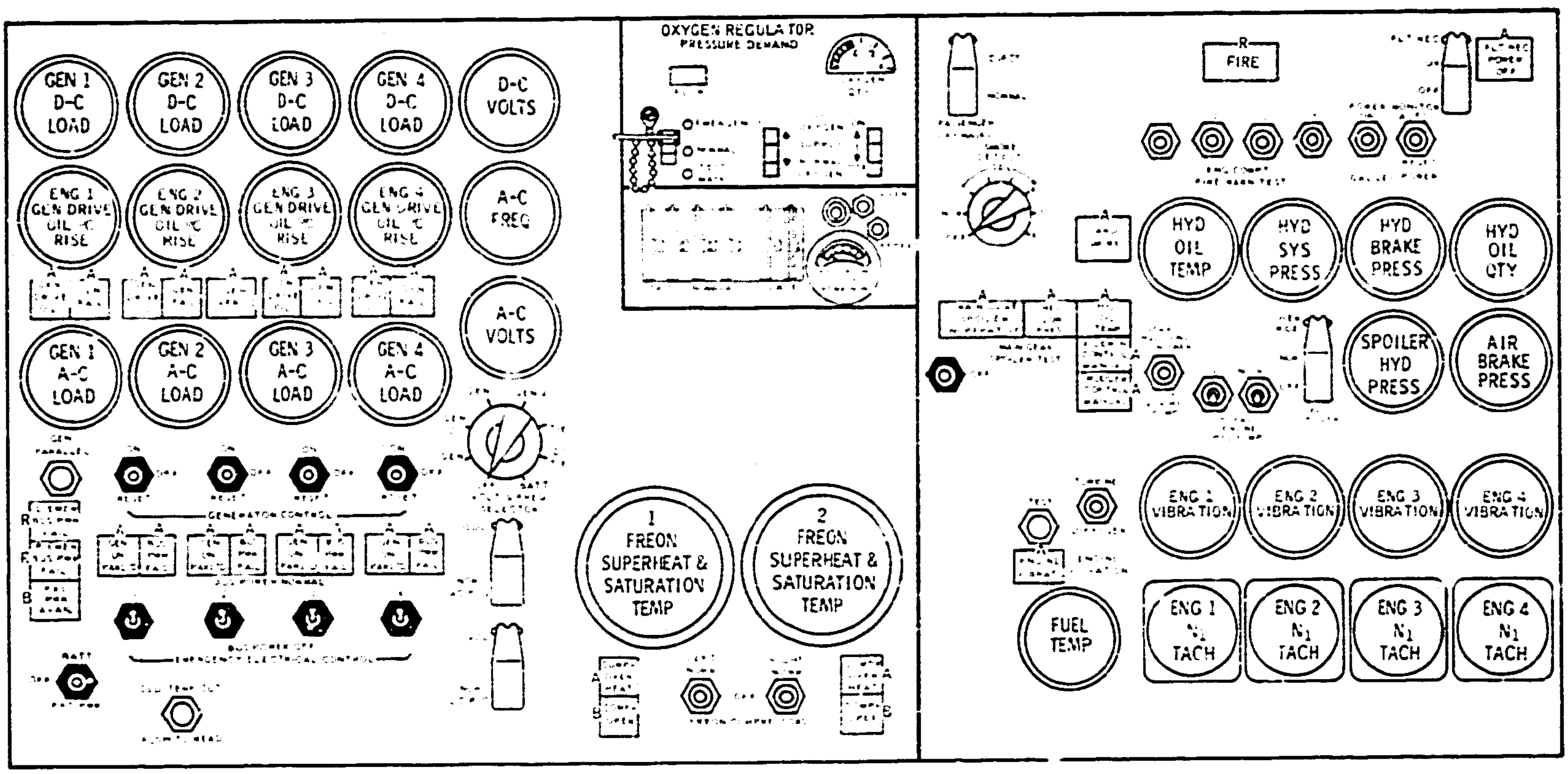
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
= LEVER-LOCK SWITCH
* INSTALLED ON I-DMC
** INSTALLED ON 46142

HA2-3598

Systems Engineer's Control Panel (Upper Section)
Figure 1



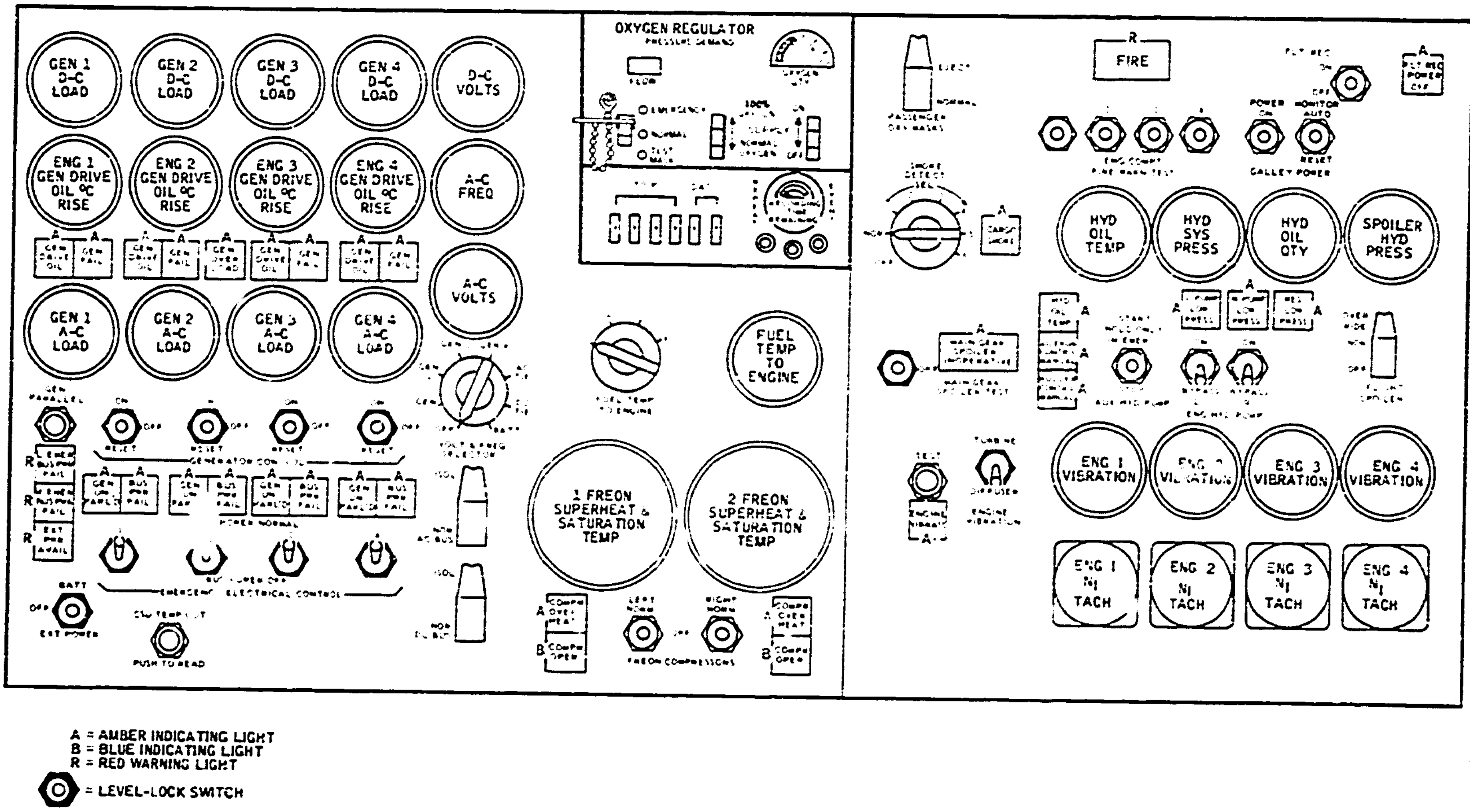
Systems Engineer's Control Panel (Upper Section)
Figure 1



A – AMBER INDICATING LIGHT
B – BLUE INDICATING LIGHT
R – RED WARNING LIGHT
– LEVER-LOCK SWITCH

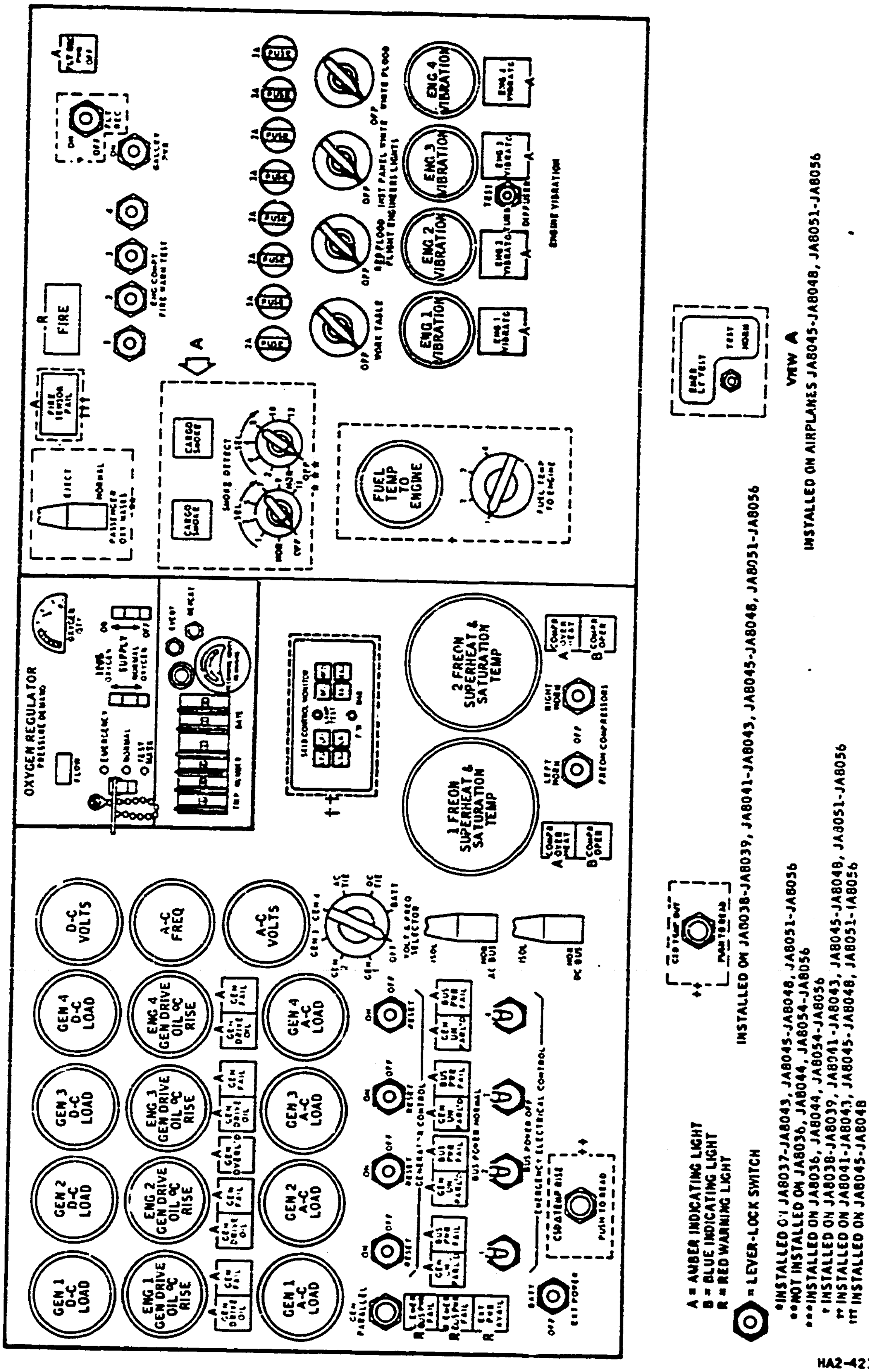
HA2-3634A

Systems Engineer's Control Panel (Upper Section)
Figure 1



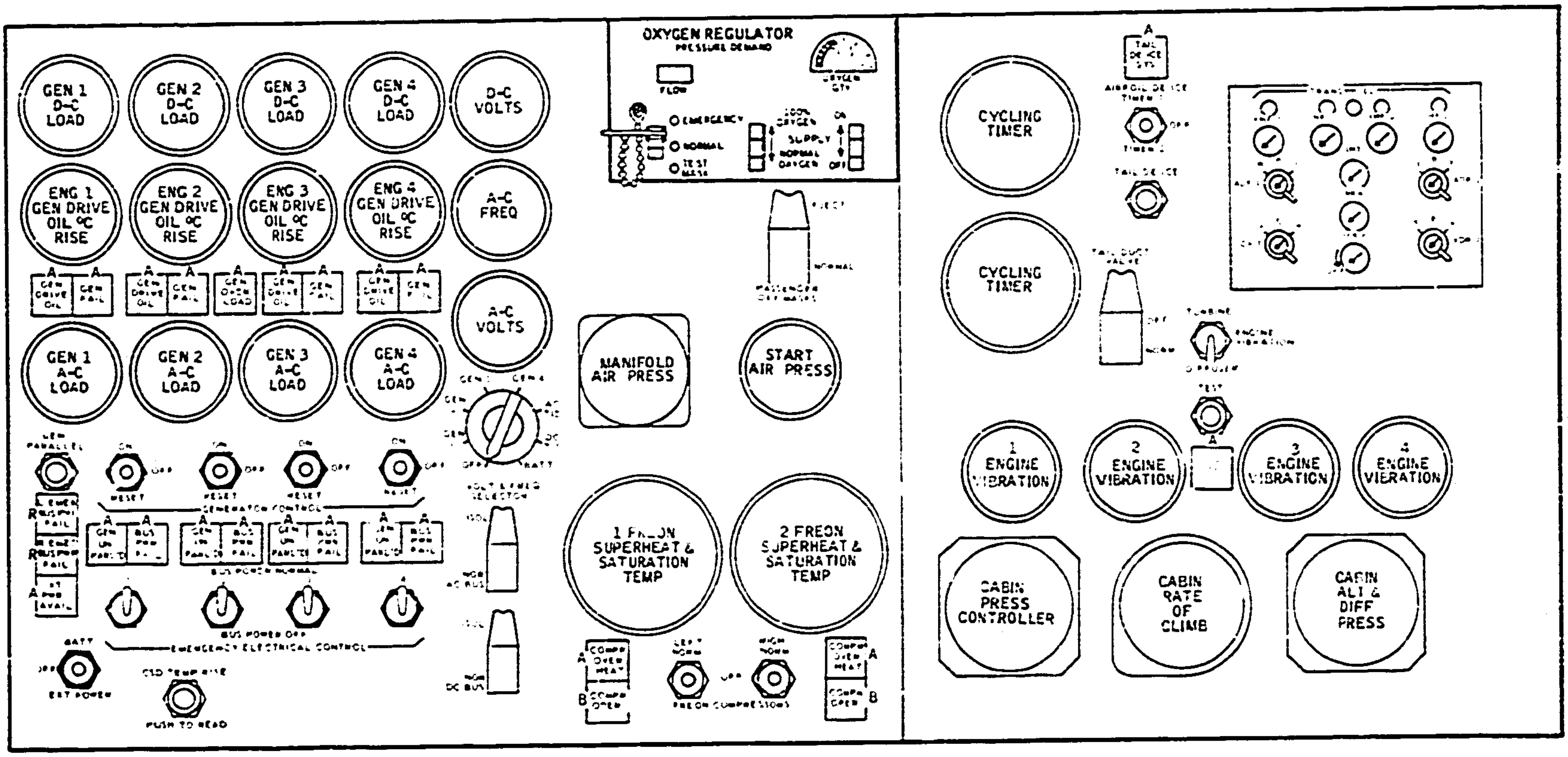
HA2-3688C

Systems Engineer's Control Panel (Upper Section)
Figure 1



Systems Engineer's Control Panel (Upper Section)
Figure 1

Printed in U.S.A.

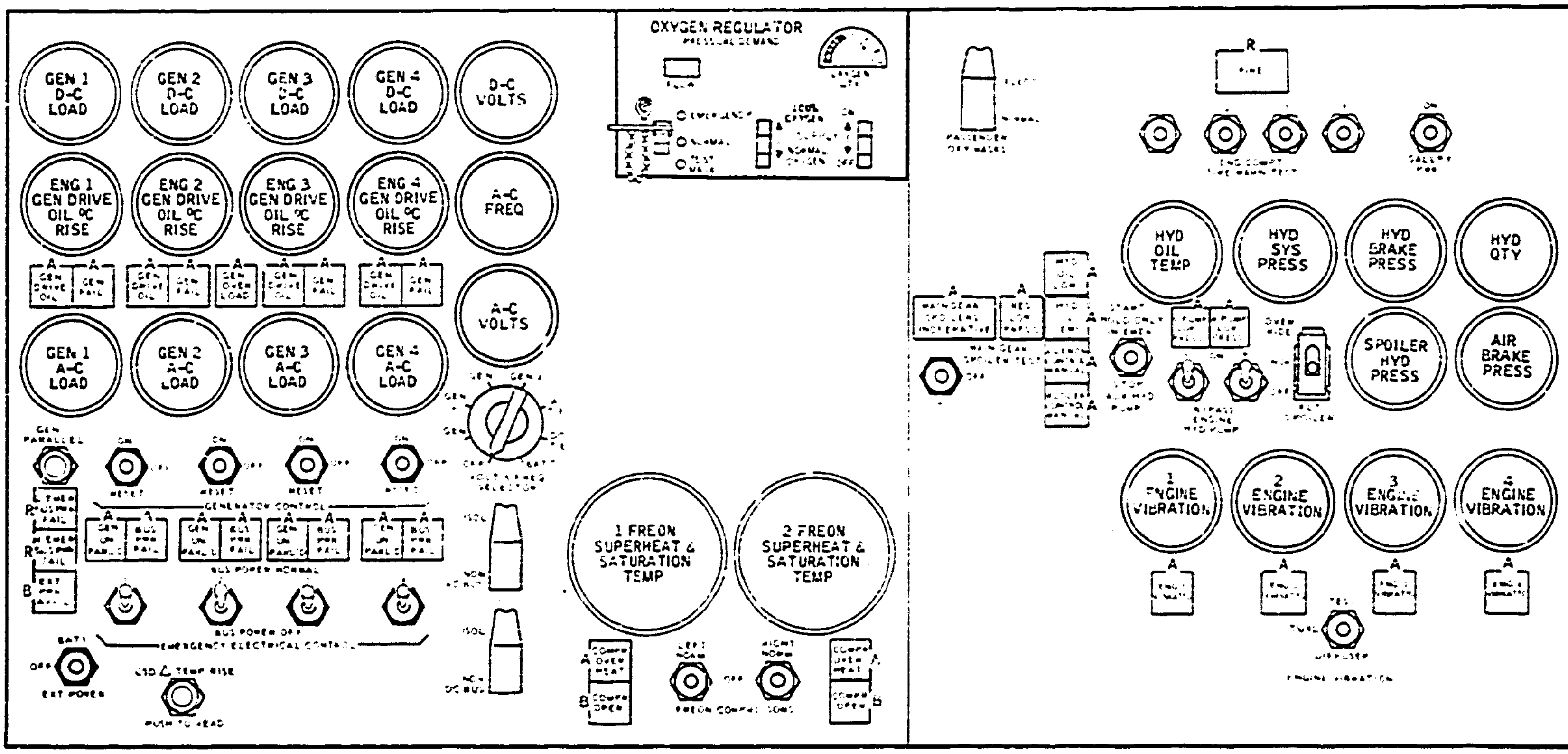


A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
= LEVEL-LOCK SWITCH

1A2-3722A

Systems Engineer's Control Panel (Upper Section)
Figure 1

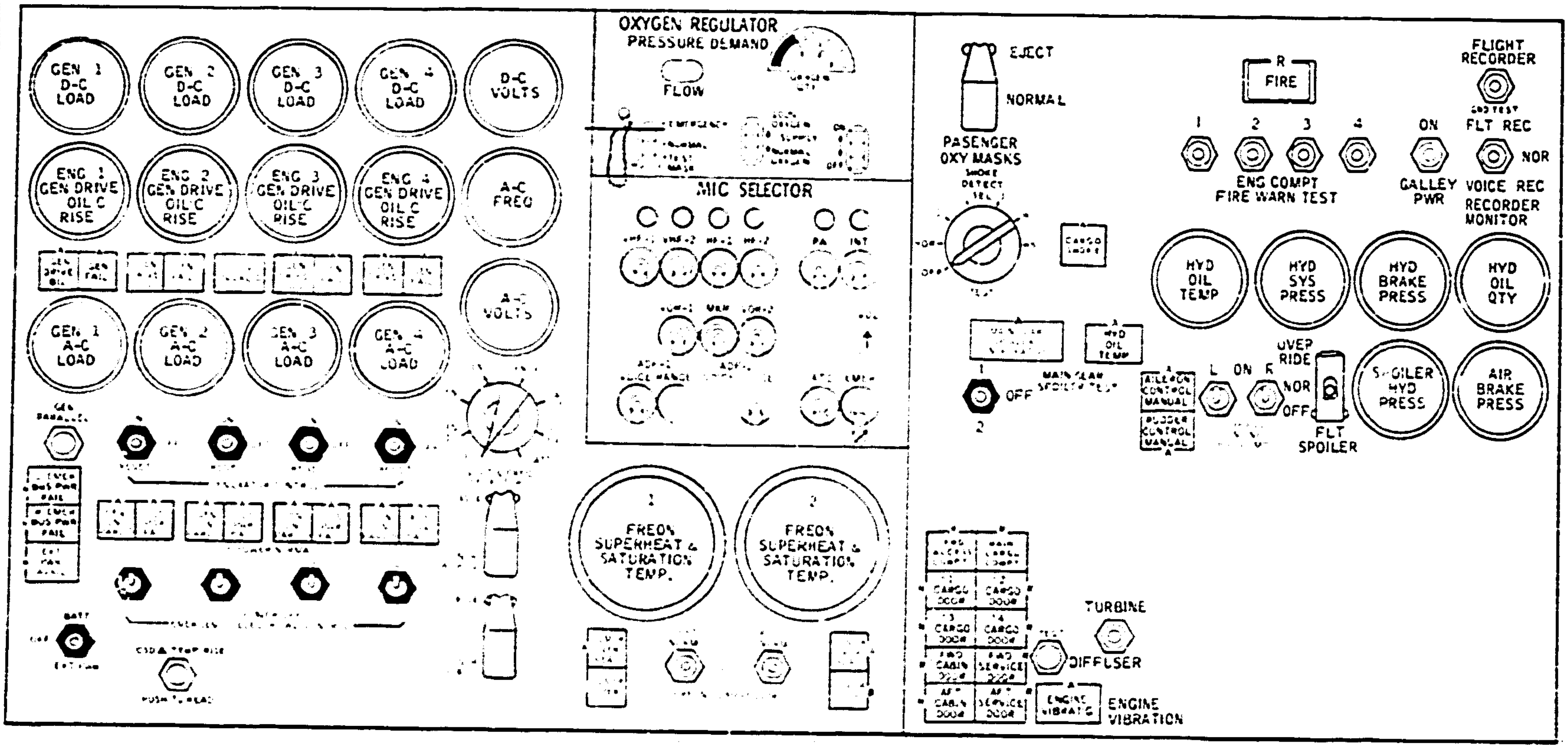
Printed in U.S.A.



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
(O) = LEVEL-LOCK SWITCH

1A2 - 3759A

Systems Engineer's Control Panel (Upper Section)
Figure 1

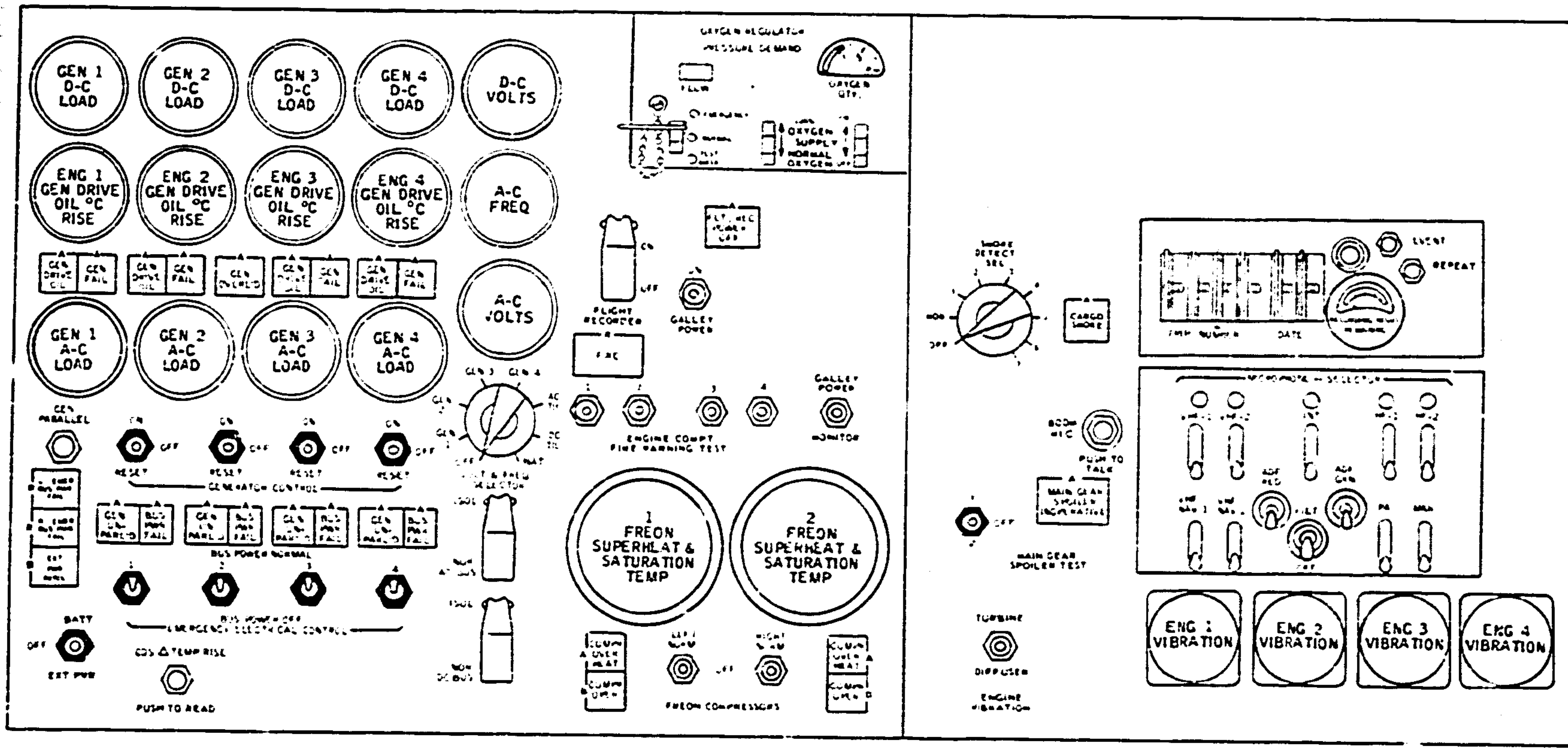


A — AMBER INDICATING LIGHT
B — BLUE INDICATING LIGHT
R — RED WARNING LIGHT
LEVER-LOCK SWITCH

11A2-4224A

Systems Engineer's Control Panel (Upper Section)
Figure 1

Printed in U.S.A.

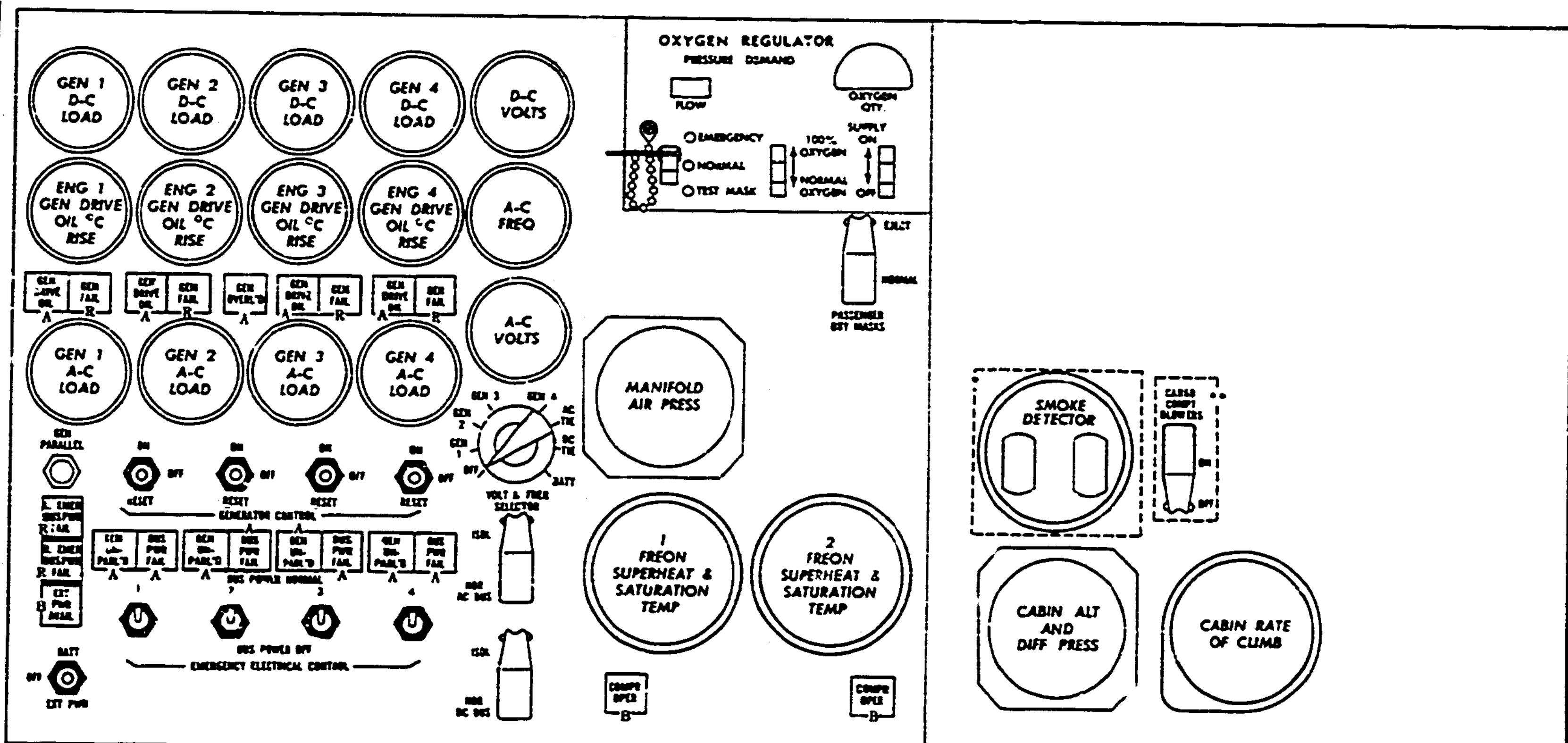


A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
= LEVER-LOCK SWITCH

HA2-44608

Systems Engineer's Control Panel (Upper Section)
Figure 1

Printed in U.S.A.

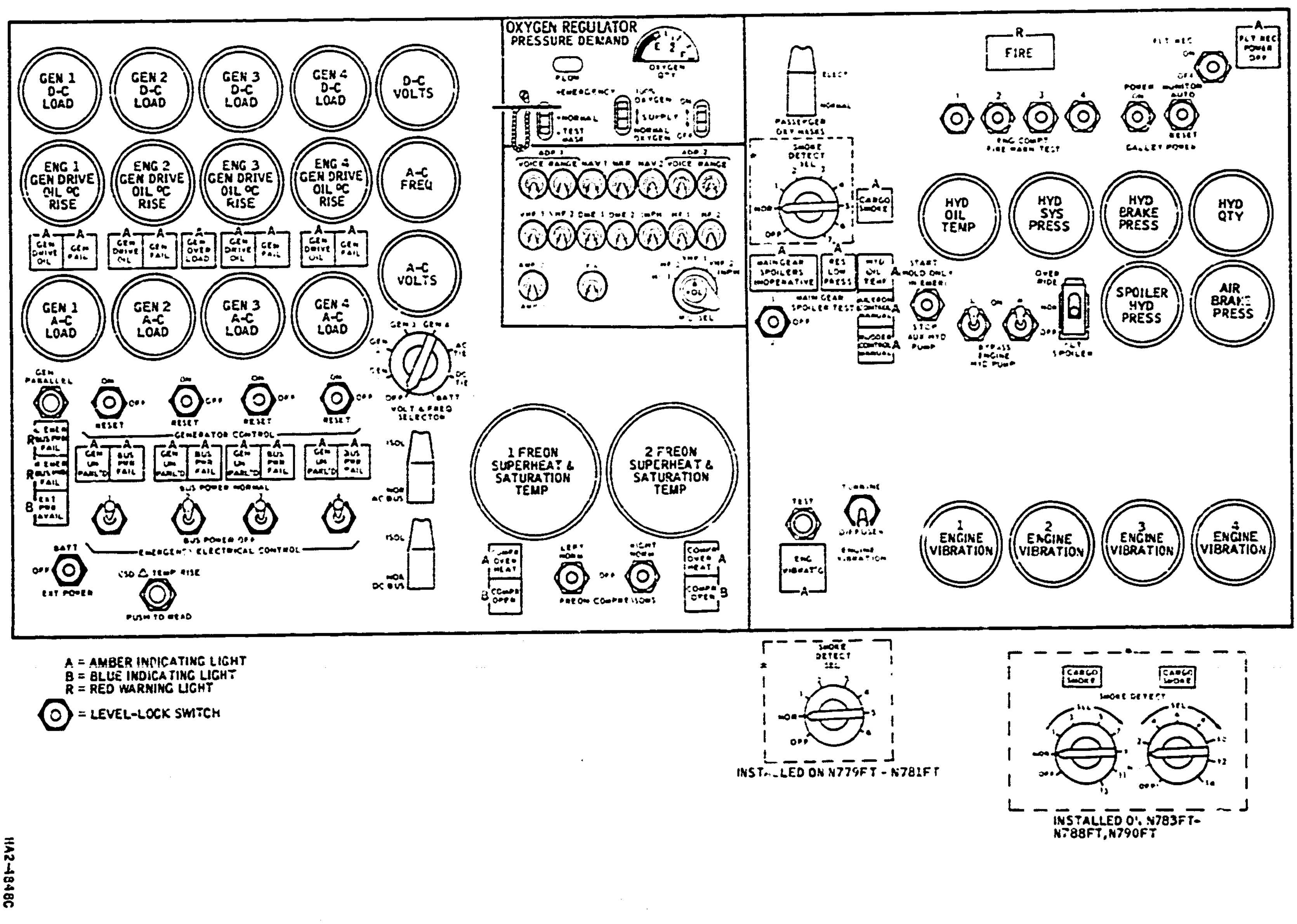


A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
⬡ = LEVER-LOCK SWITCH

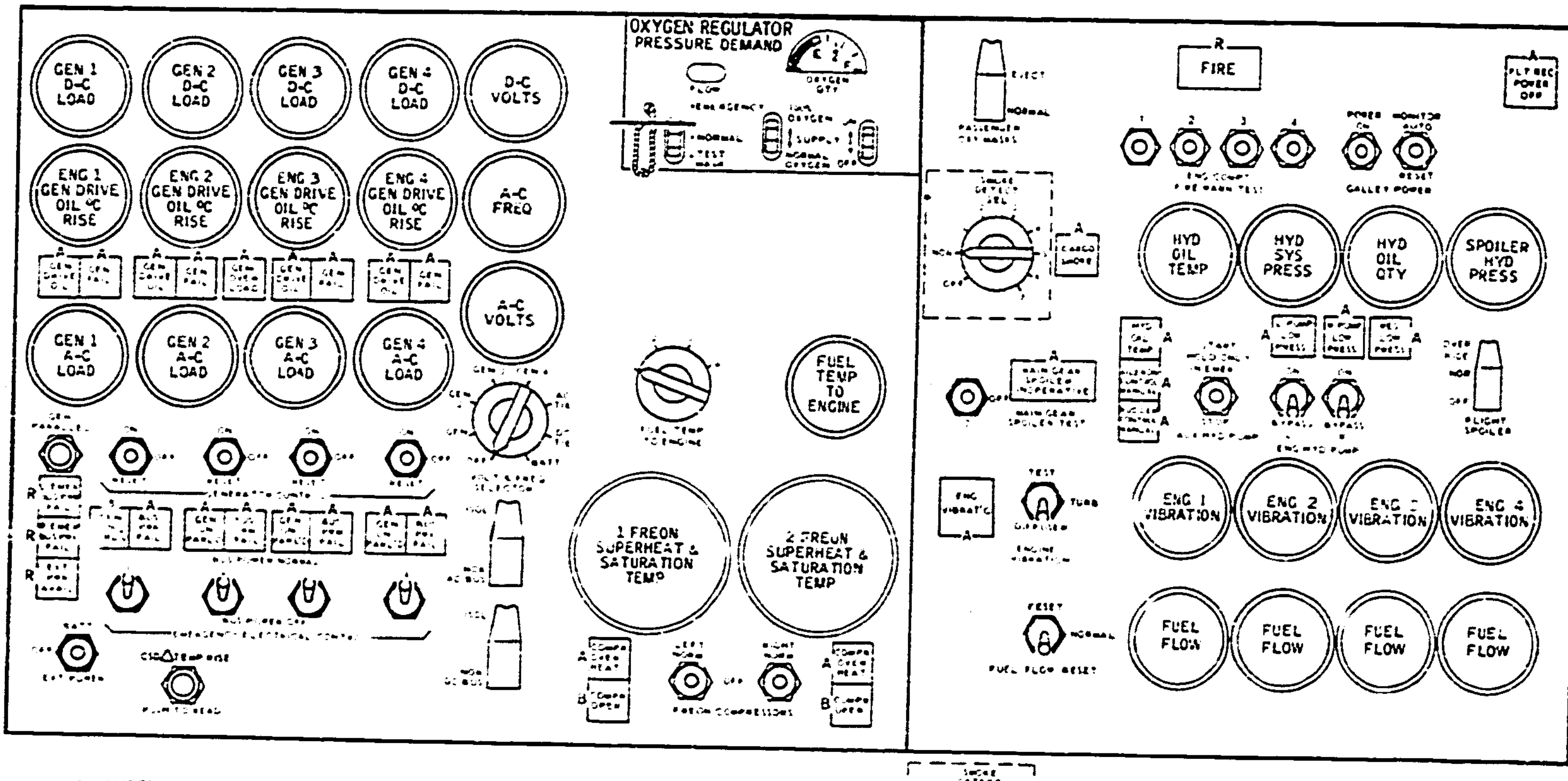
• = NOT INSTALLED ON 801-811, 8[illegible]-822
•• = INSTALLED ON 812, 813 ONLY

H1-824C

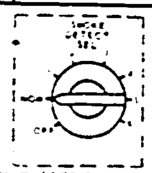
Systems Engineer's Control Panel (Upper Section)
Figure 1



Systems Engineer's Control Panel (Upper Section)
Figure 1



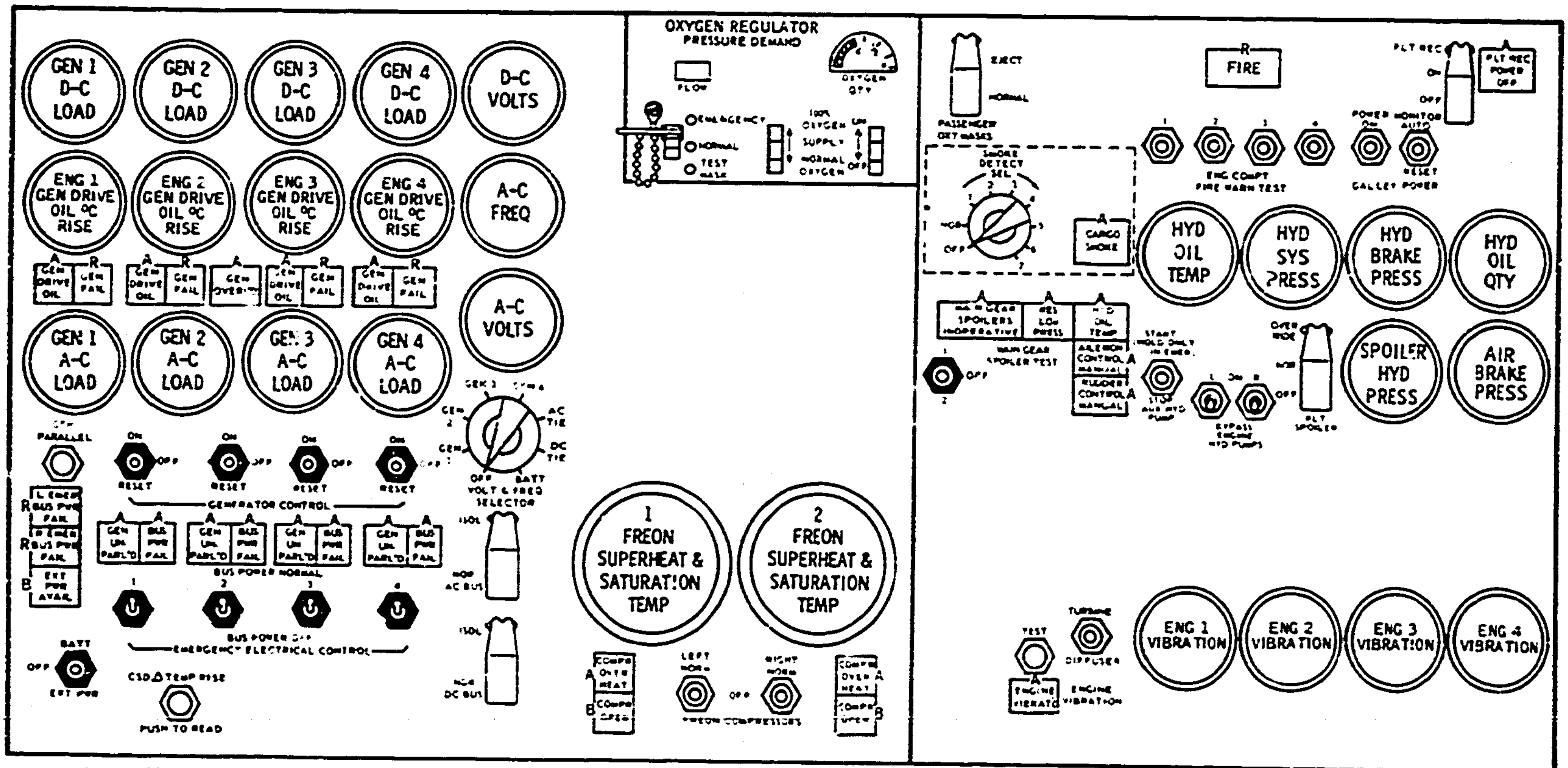
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
⬡ = LEVER-LOCK SWITCH



INSTALLED ON N8631

HA2-1852B

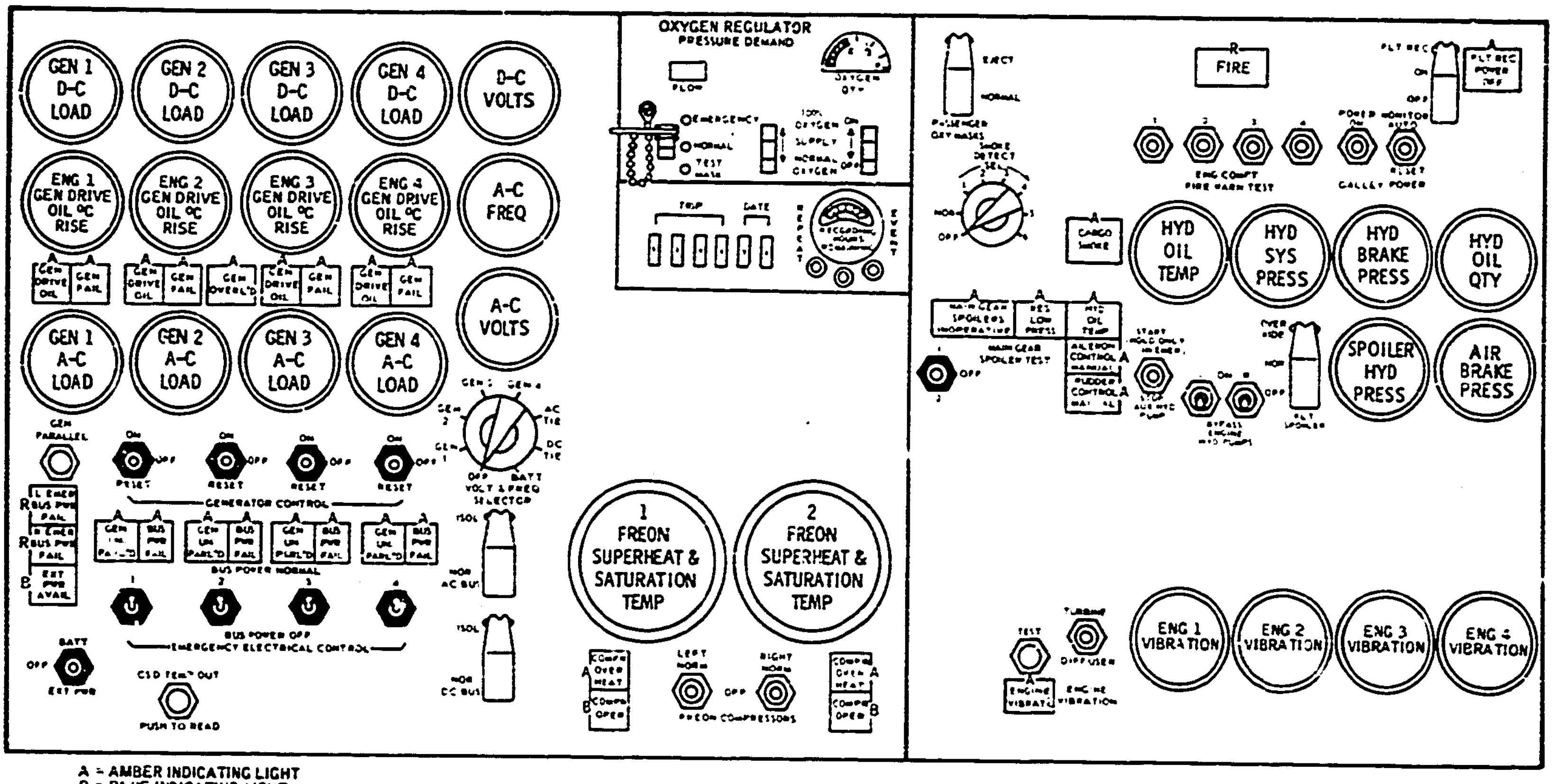
Systems Engineer's Control Panel (Upper Section)
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
(symbol) = LEVER-LOCK SWITCH
* = INSTALLED ON EC-BMZ

HA2-48510

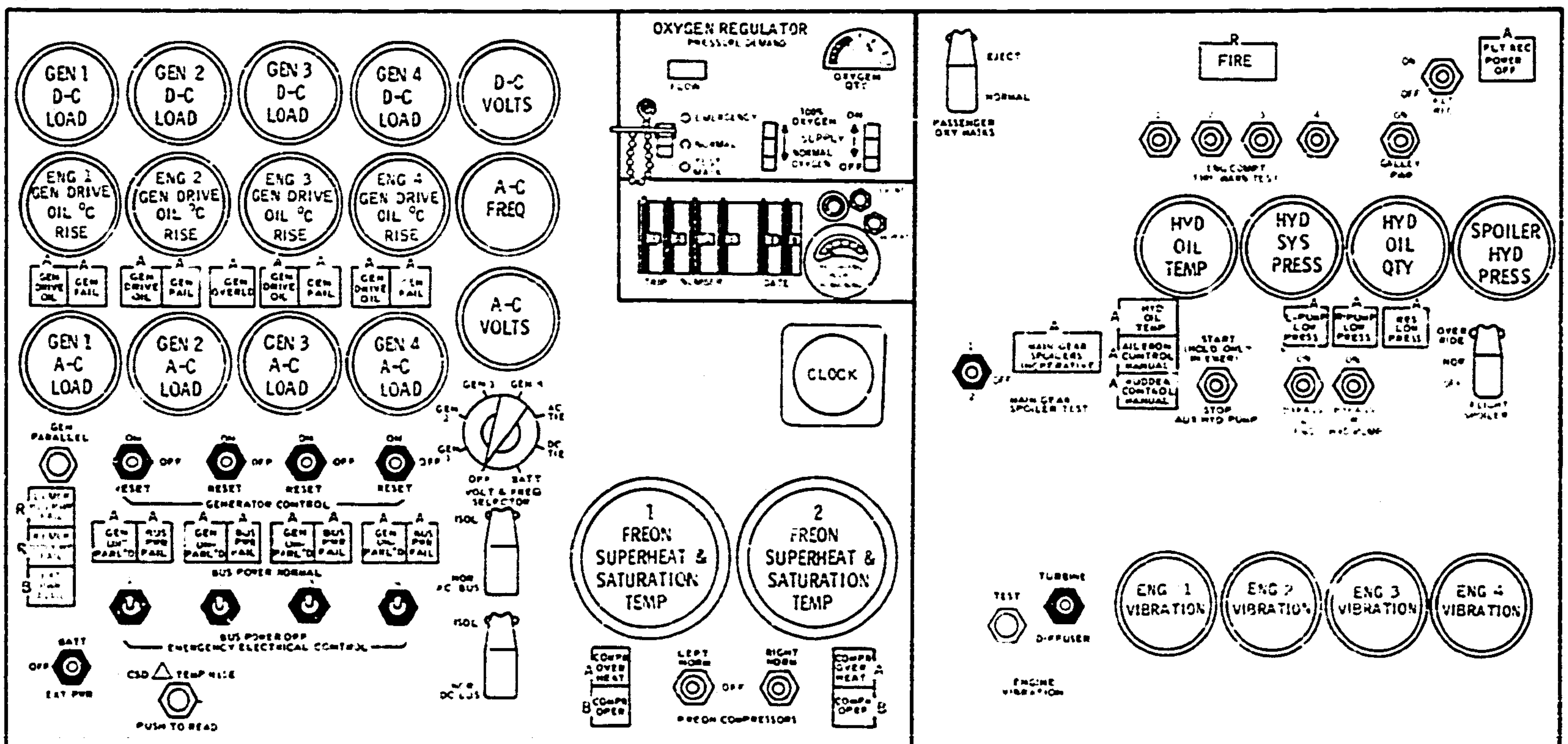
Systems Engineer's Control Panel (Upper Section)
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
= LEVER-LOCK SWITCH

HA2-4850

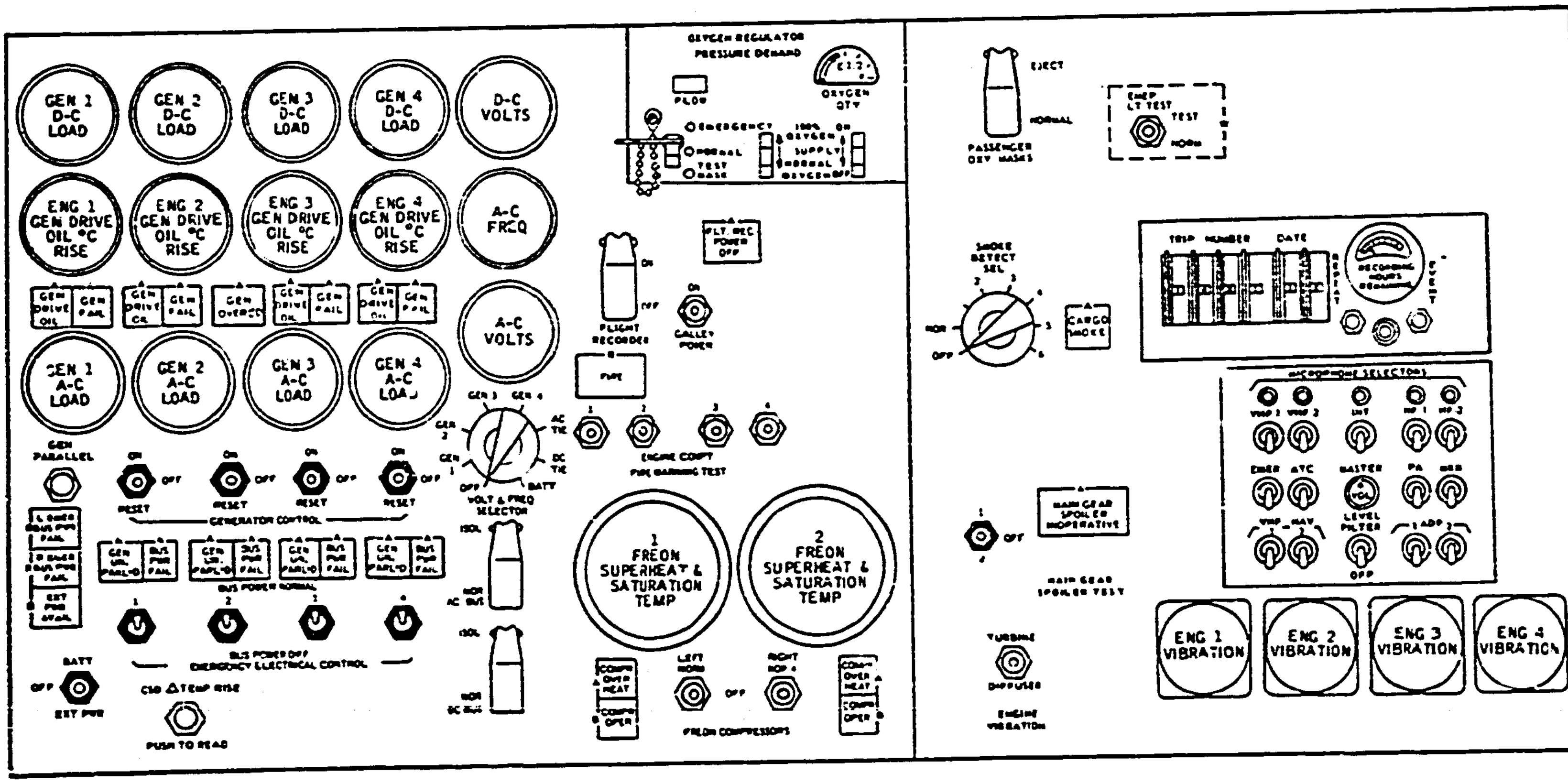
Systems Engineer's Control Panel (Upper Section)
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
= LEVER-LOCK SWITCH

HA2-5606

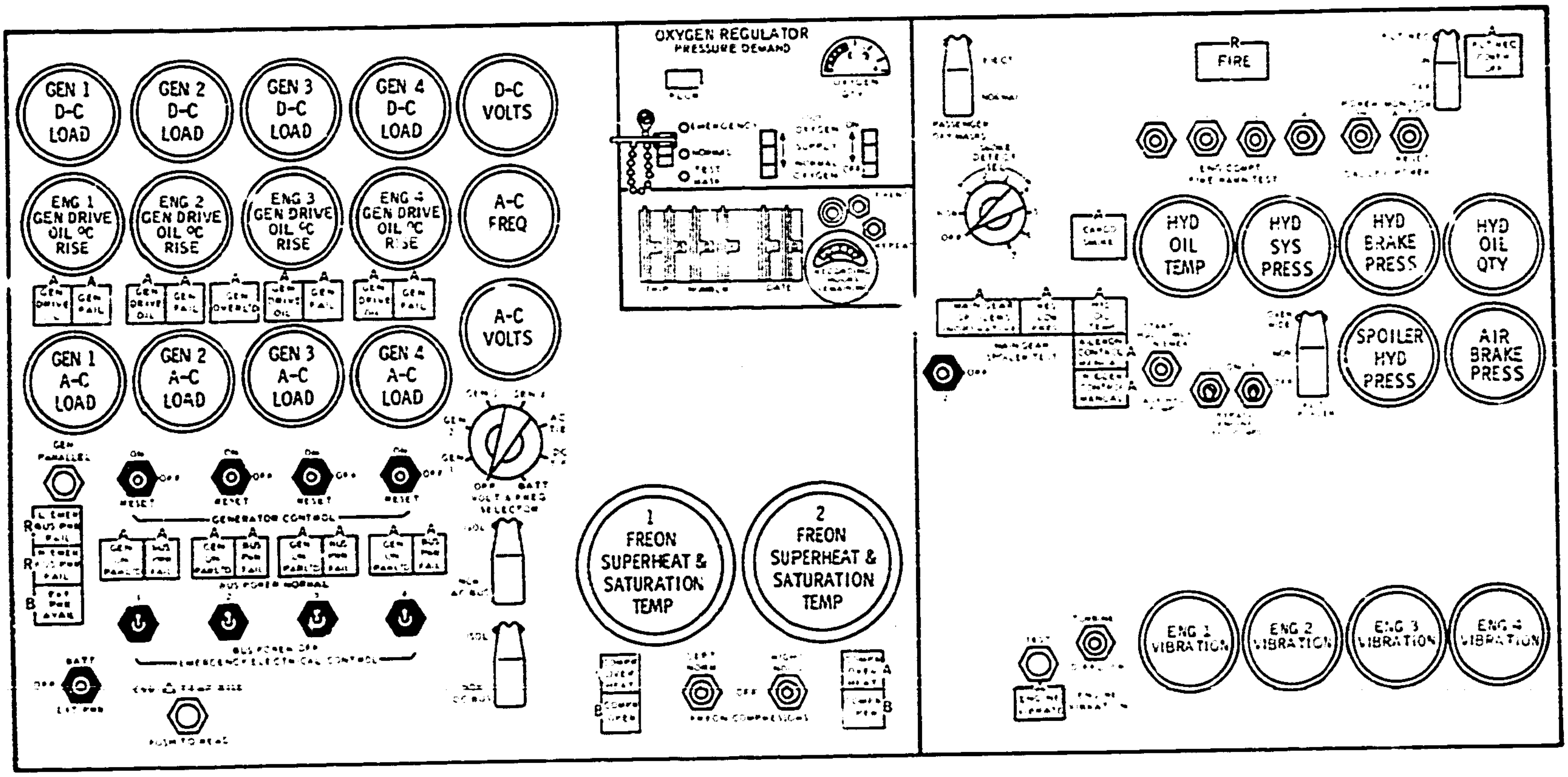
Systems Engineer's Control Panel (Upper Section)
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
= LEVER-LOCK SWITCH
*INSTALLED ON 46130

HA2-5613A

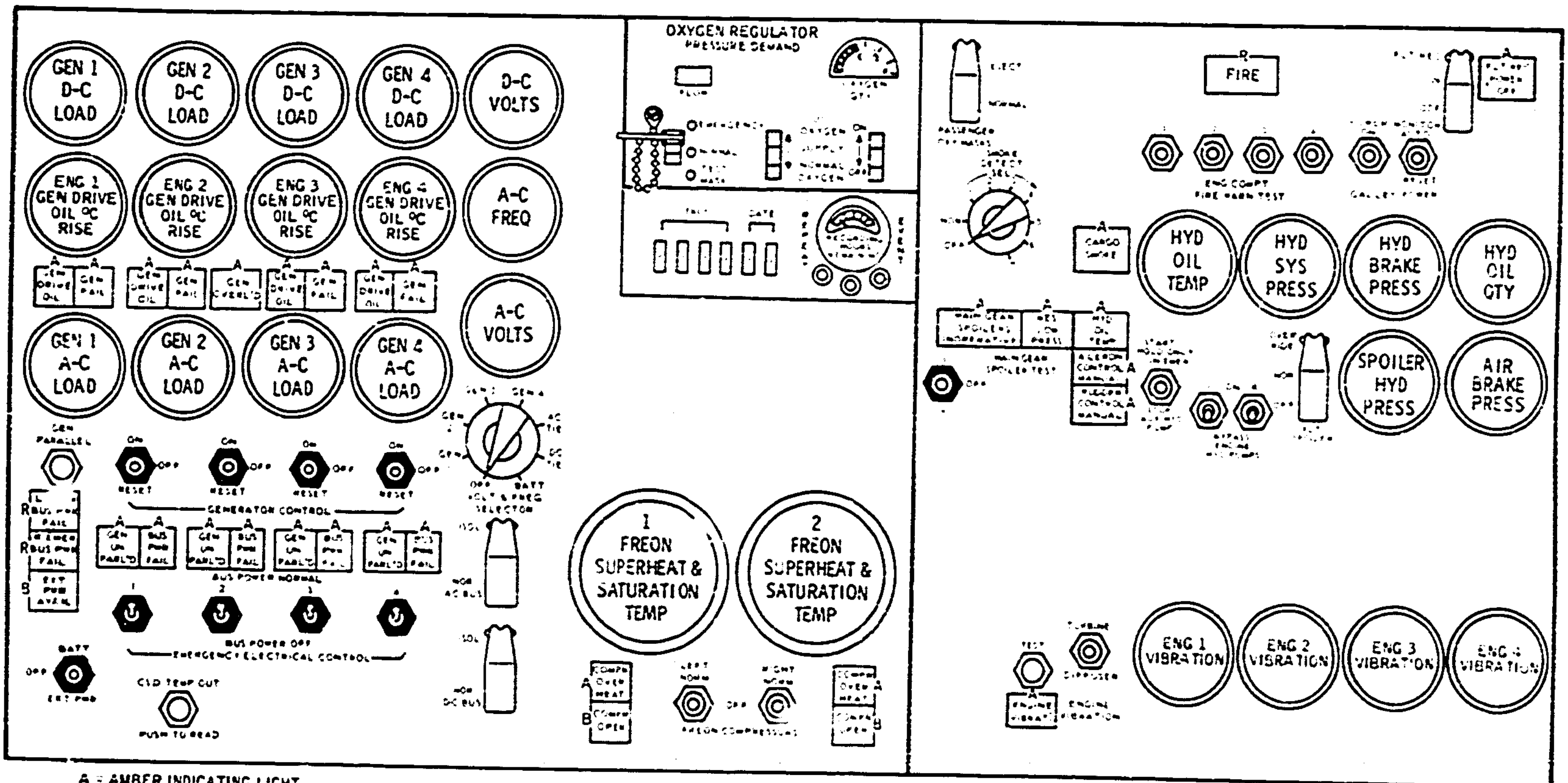
Systems Engineer's Control Panel (Upper Section)
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
= LEVER-LOCK SWITCH

HA2-5775A

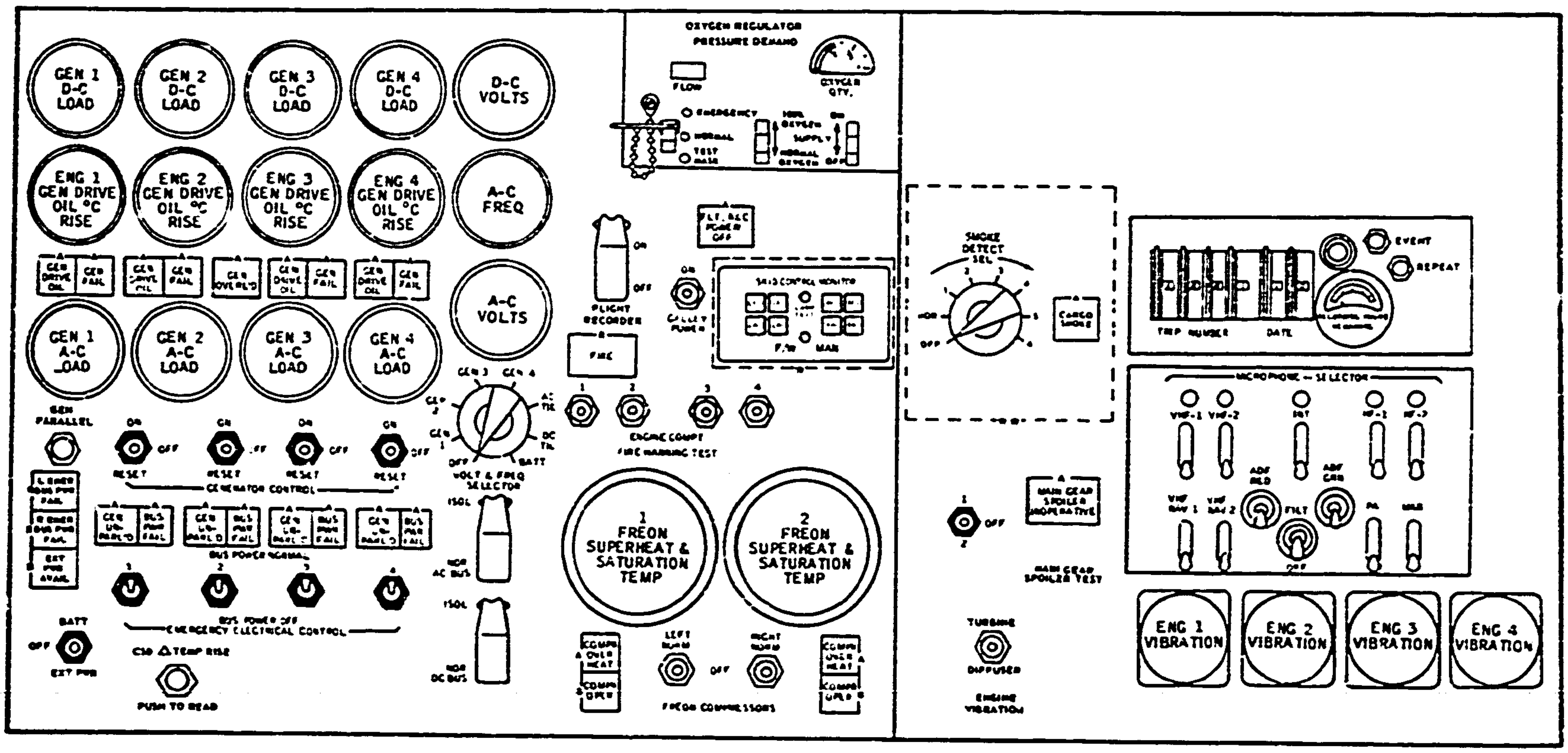
Systems Engineer's Control Panel
(Upper Section)
Figure 1



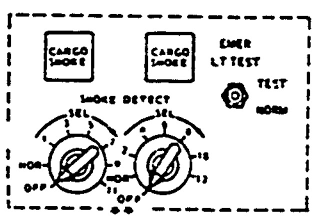
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
= LEVER-LOCK SWITCH

HA2-6057

Systems Engineer's Control Panel (Upper Section)
Figure 1



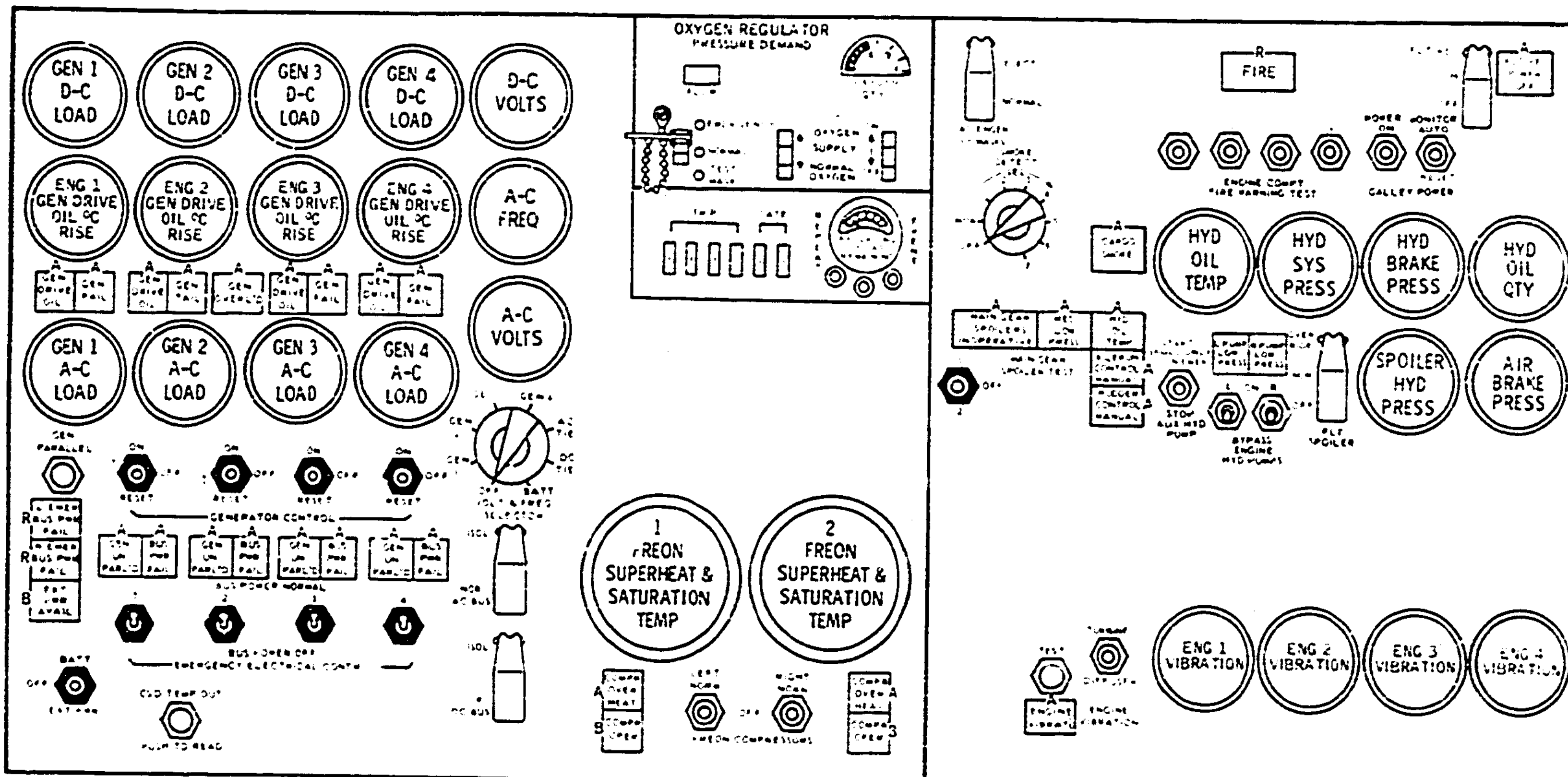
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
= LEVER-LOCK SWITCH
* INSTALLED ON 78



INSTALLED ON 78

HA2-6408A

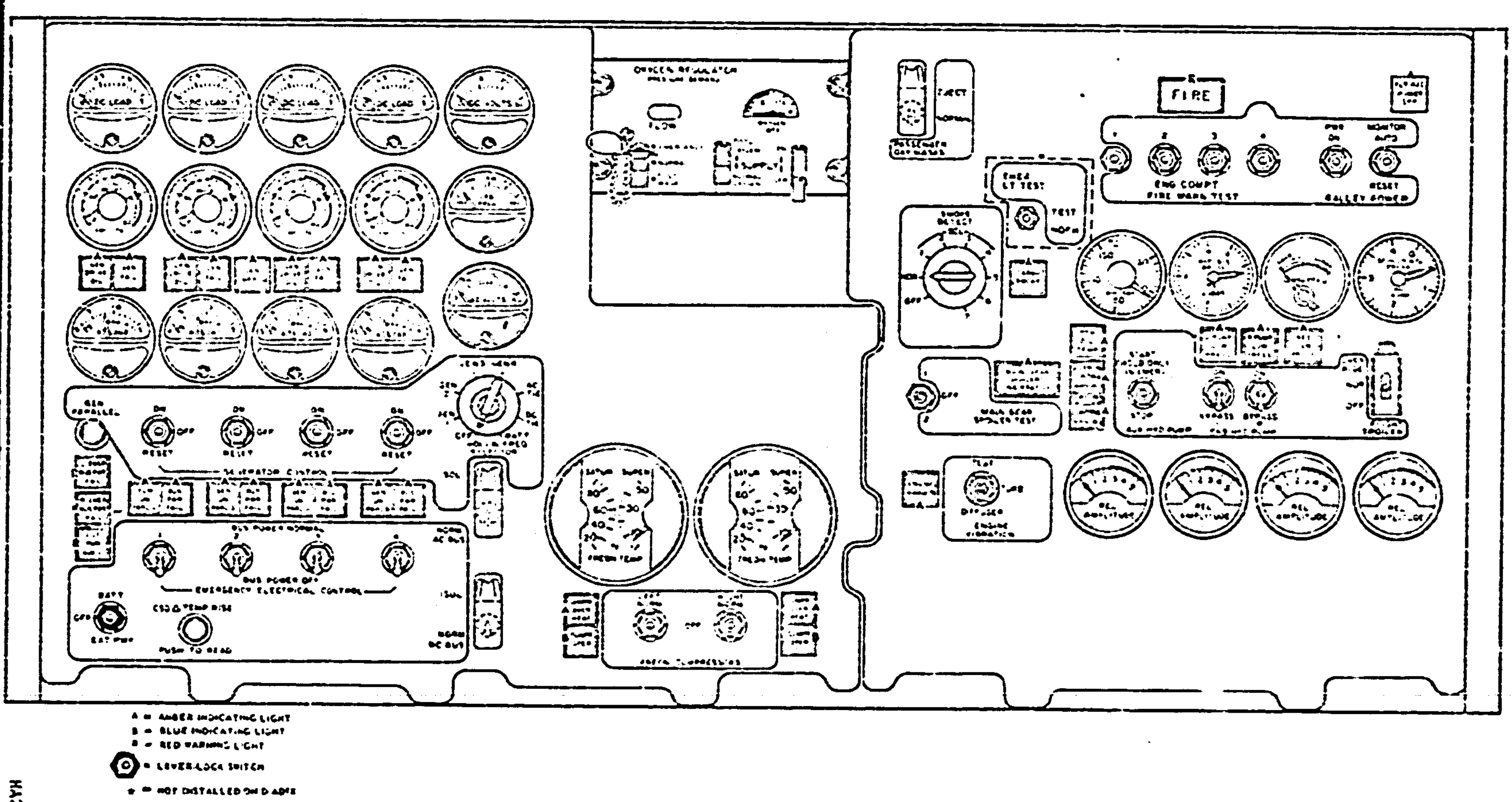
Systems Engineer's Control Panel (Upper Section)
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
= LEVER LOCK SWITCH

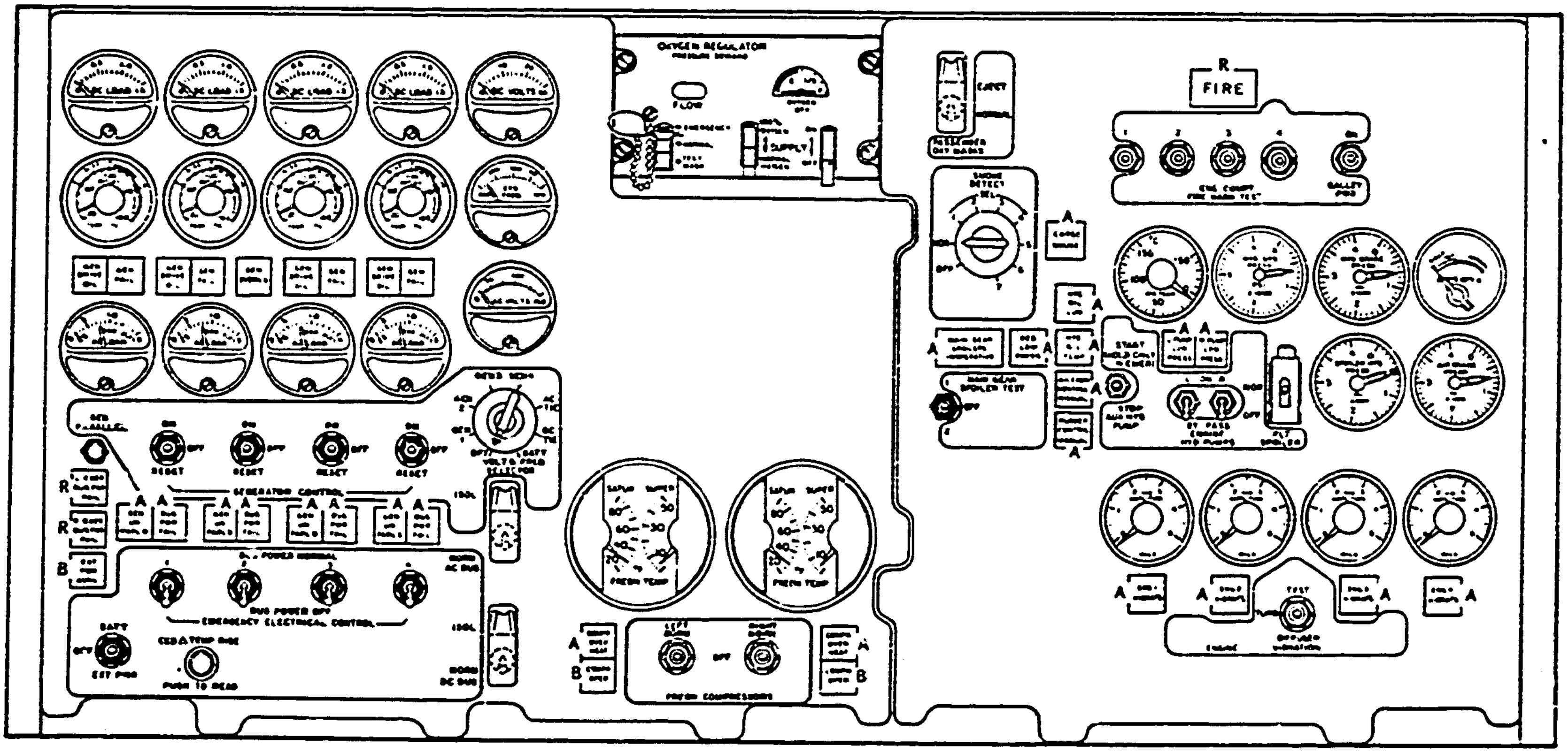
HA2-6463

Systems Engineer's Control Panel (Upper Section)
Figure 1



HA2-4892B

Systems Engineer's Control Panel (Upper Section)
Figure 1

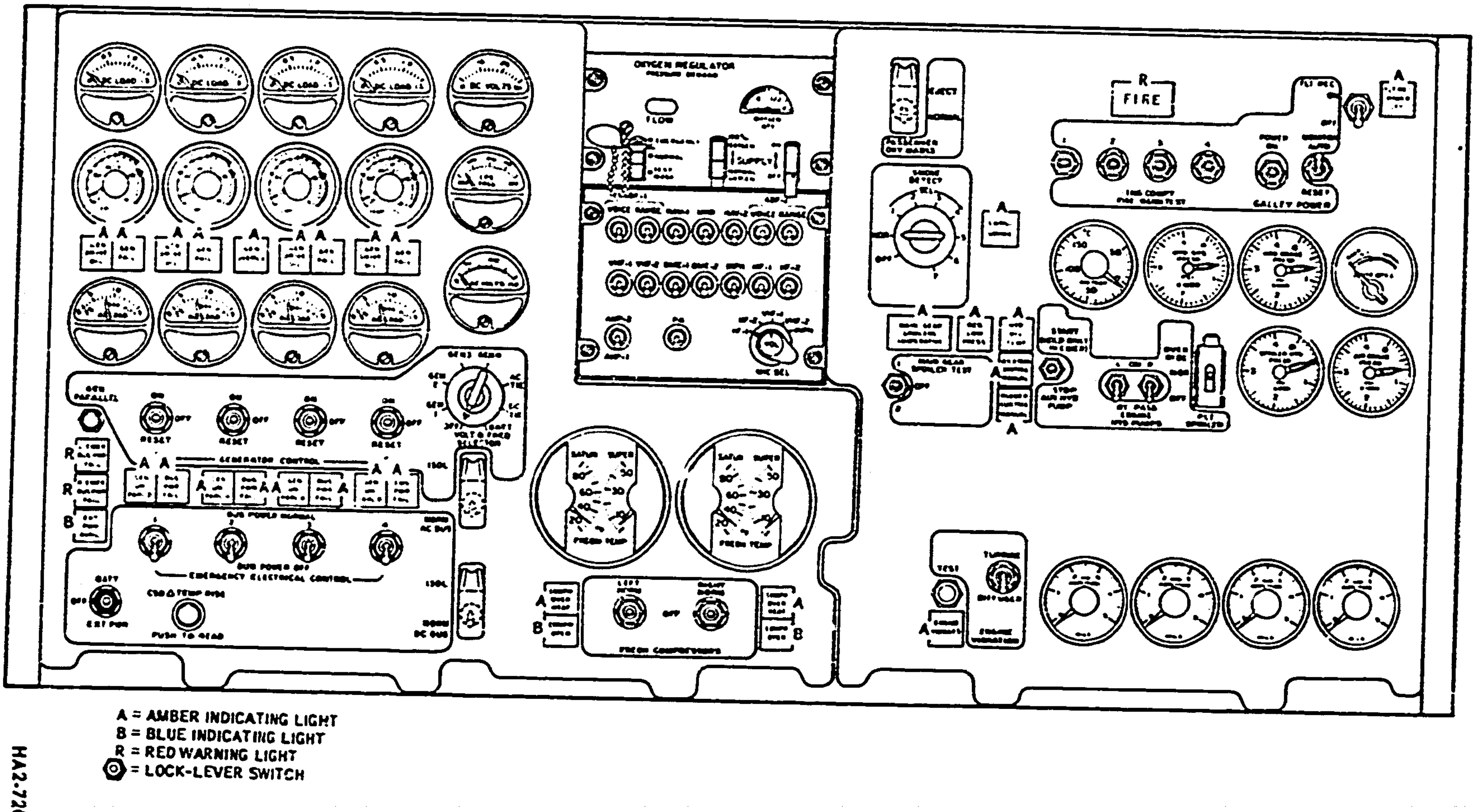


A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
⊚ = LEVER-LOCK SWITCH

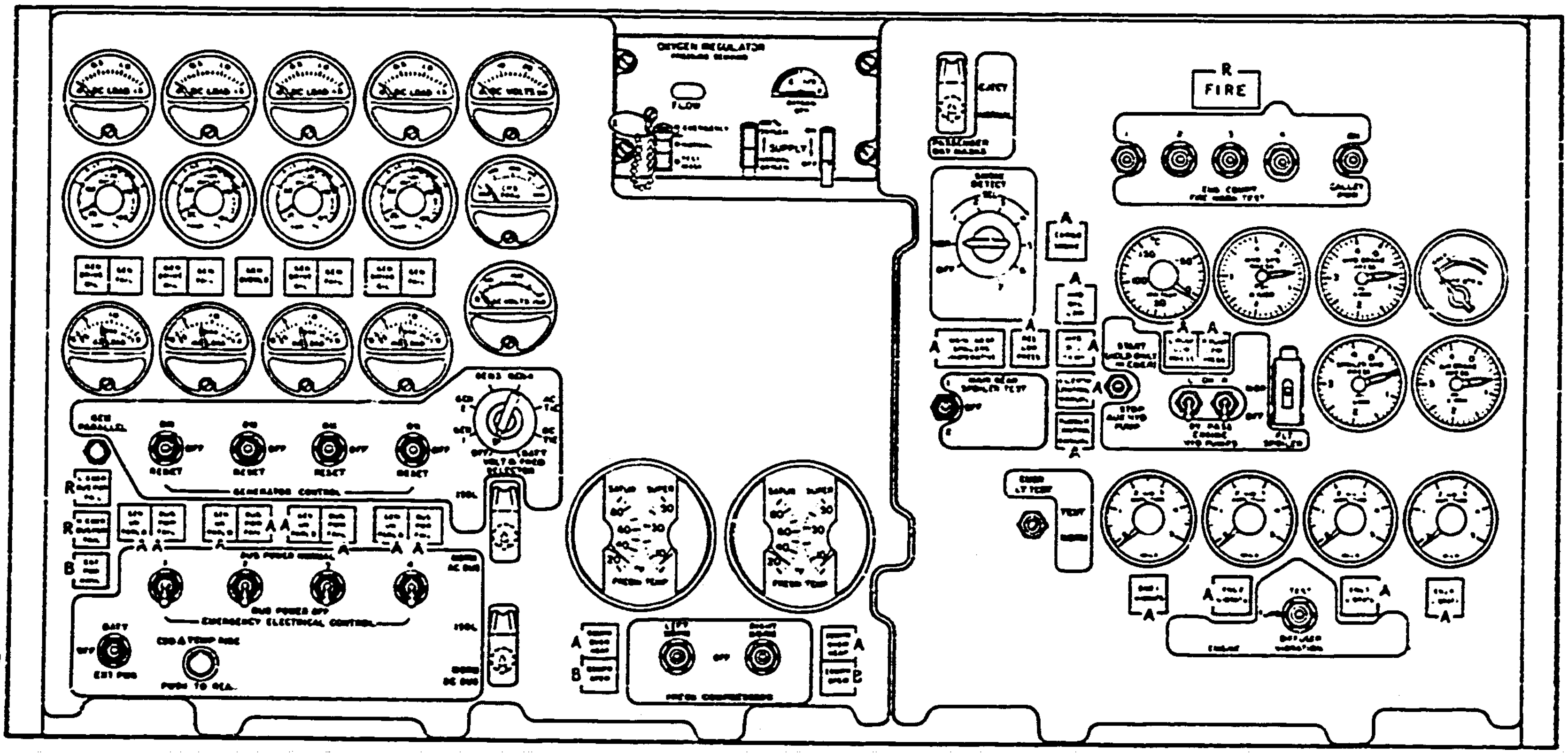
HA2-7137

Systems Engineer's Control Panel (Upper Section)
Figure 1

Printed in U.S.A.



Systems Engineer's Control Panel (Upper Section)
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
⊙ = LOCK-LEVER SWITCH

HA2-7446

Systems Engineer's Control Panel (Upper Section)
Figure 1

Printed in U.S.A.

SYSTEMS ENGINEER'S CONTROL PANEL (UPPER SECTION) - MAINTENANCE PRACTICES

1. General

A. In order to remove the systems engineer's control panel (upper section), it is necessary to remove all power from the airplane and to disconnect all electrical connectors from the panel. The electrical leads from the smaller components mounted on the panel are ganged into multiple-contact plugs mounted on a rack firmly fixed to the panel and designed to mate with spring-loaded, structure-mounted receptacles. The panel is subjected to heavy pressure, which must be relieved evenly when the panel is removed, allowing it to eject straight out, avoiding damage to the panel and electrical connectors.

B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Systems Engineer's Panel (Upper Section)

A. Remove Left Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

(2) Inspect instruments for properly secured mounting.

(3) Restrain panel and release quick-release fasteners around perimeter. Carefully allow panel to eject until spring pressure is relieved.

(4) Lift panel-out a few inches and disconnect lines and electrical connectors.

(5) Carefully lower panel and remove from cavity.

(6) Tag and cap all lines, ports, and electrical connectors.

B. Install Left Panel

(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Carefully place panel in cavity and apply pressure evenly to panel to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure with quick-release fasteners.

(7) Perform operational test of all systems involved to determine integrity of new installation.

C. Remove Right Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

NOTE: Hydraulic oil temperature, hydraulic system pressure, hydraulic brake pressure, hydraulic oil quantity, hydraulic spoiler pressure, and oil brake pressure indicators are rack-and-panel mounted.

(2) Restrain each rack-and-panel mounted instrument by hand pressure around edge of bezel, loosen mounting clamp adjustment screw, and allow instrument to eject slowly until spring pressure is relieved.

(3) Pull instruments clear of connector (about halfway out of cutout) and tighten mounting clamp adjustment screw.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING REMOVAL OPERATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

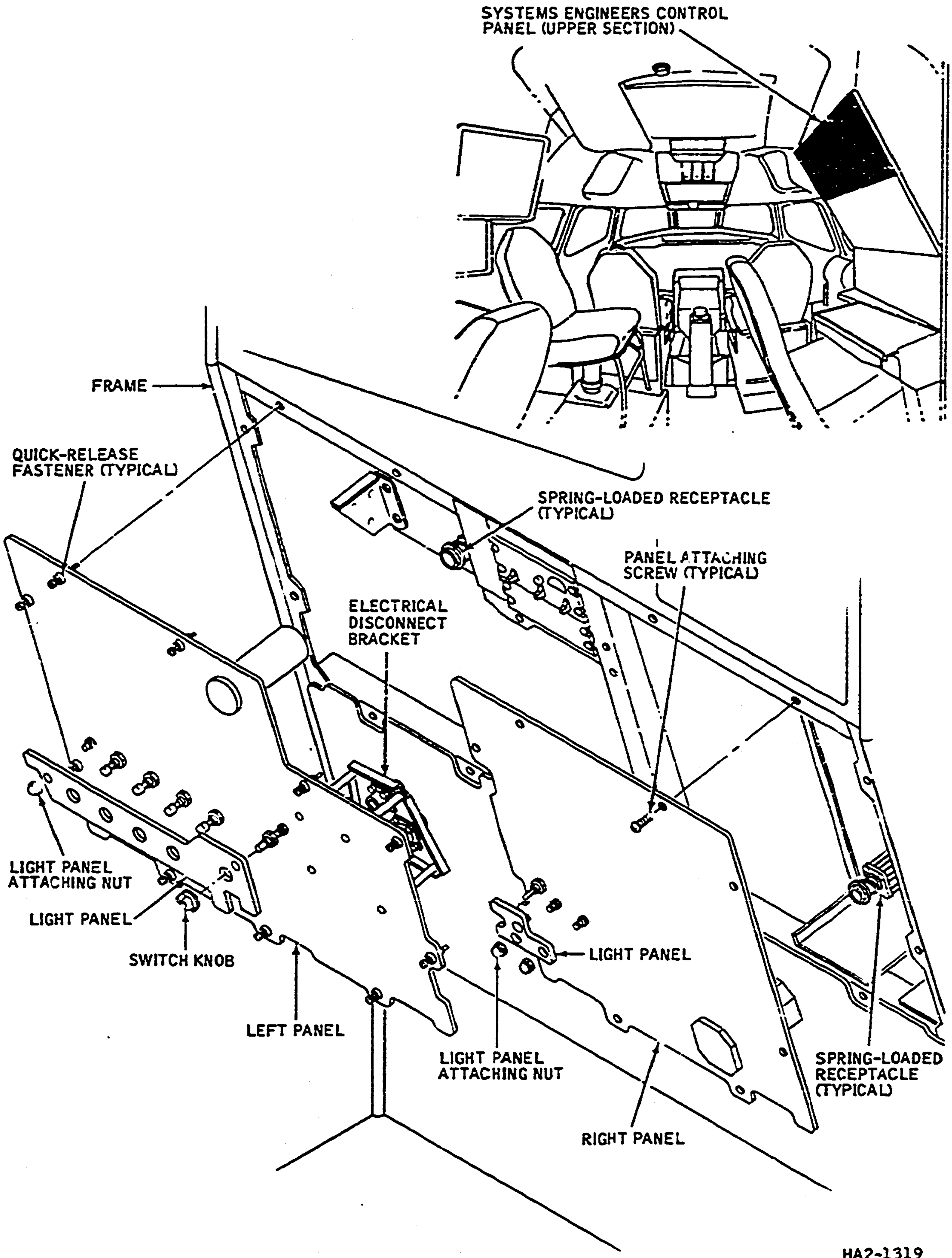
(4) Inspect instruments for properly secured mounting.

(5) Restrain panel and remove attaching screws around perimeter. Carefully allow panel to eject until spring pressure is relieved.

(6) Lift panel out a few inches, and disconnect lines and electrical connectors.

(7) Carefully lower panel and remove from cavity.

(8) Tag and cap all lines, ports, and electrical connectors.



Systems Engineer's Control Panel
(Upper Section) Replacement
Figure 201

D. Install Right Panel

(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

NOTE: Rack-and-panel mounted instruments should be clamped in extended position.

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Carefully position panel in cavity and apply pressure evenly to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure with attaching screws.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING INSTALLATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(7) Loosen clamp adjustment screws on rack-and-panel mounted instruments and press instruments into cavities.

(8) Tighten mounting clamps.

(9) Perform operational test of all systems involved to determine integrity of new installation.

SYSTEMS ENGINEER'S CONTROL PANEL (UPPER SECTION) - MAINTENANCE PRACTICES

1. General

A. In order to remove the systems engineer's control panel (upper section), it is necessary to remove all power from the airplane and to disconnect all electrical connectors from the instruments. The electrical leads from the smaller components mounted on the left panel are ganged into multiple-contact plugs mounted on a rack firmly fixed to the panel and designed to mate with spring-loaded, structure-mounted receptacles. The panel is subjected to heavy pressure, which must be relieved evenly when the panel is removed, allowing it to eject straight out, avoiding damage to the panel and electrical connectors.

B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Systems Engineer's Panel (Upper Section)

A. Remove Left Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

(2) Inspect instruments for properly secured mounting.

(3) Restrain panel and release quick-release fasteners around perimeter. Carefully allow panel to eject until spring pressure is relieved.

(4) Lift panel out a few inches and disconnect lines and electrical connectors.

(5) Carefully lower panel and remove from cavity.

(6) Tag and cap all lines, ports, and electrical connectors.

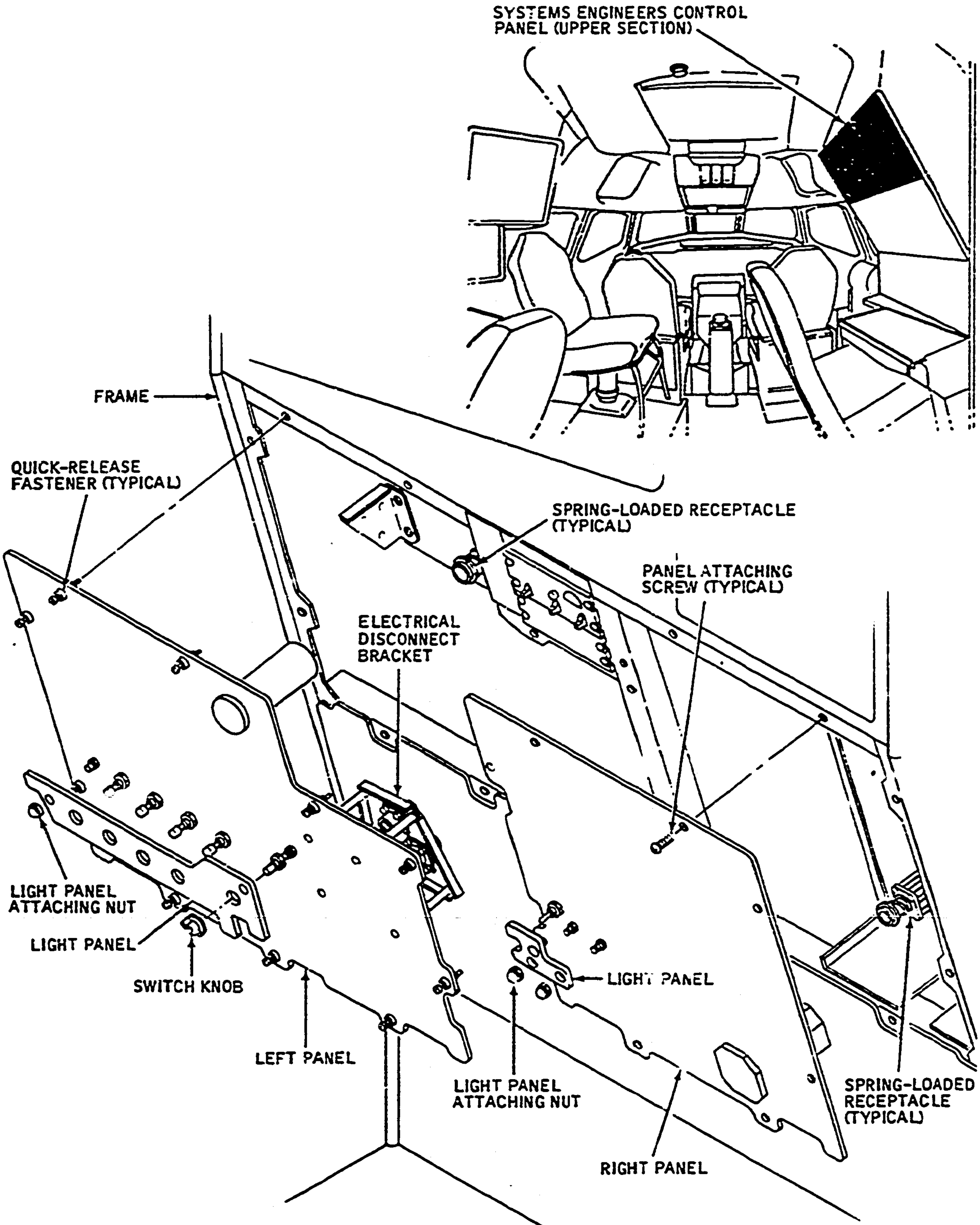
B. Install Left Panel

(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity and connect all lines, wires, and electrical connectors.



Systems Engineer's Control Panel
(Upper Section) Replacement
Figure 201

(5) Carefully place panel in cavity and apply pressure evenly to panel to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure with quick-release fasteners.

(7) Perform operational test of all systems involved to determine integrity of new installation.

C. Remove Right Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

(2) Inspect instruments for properly secured mounting.

(3) Remove attaching screws around perimeter of panel.

(4) Lift panel out a few inches, and disconnect lines and electrical connectors.

(5) Carefully lower panel and remove from cavity.

(6) Tag and cap all lines, ports, and electrical connectors.

D. Install Right Panel

(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Position panel in cavity and secure with attaching screws.

(6) Perform operational test of all systems involved to determine integrity of new installation.

SYSTEMS ENGINEER'S CONTROL PANEL (UPPER SECTION) - MAINTENANCE PRACTICES

1. General

A. In order to remove the systems engineer's control panel (upper section), it is necessary to remove all power from the airplane and to disconnect all electrical connectors from the instruments. The electrical leads from the smaller components mounted on the panel are ganged into multiple-contact plugs mounted on a rack firmly fixed to the panel and designed to mate with spring-loaded, structure-mounted receptacles. The panel is subjected to heavy pressure, which must be relieved evenly when the panel is removed, allowing it to eject straight out, avoiding damage to the panel and electrical connectors.

B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Systems Engineer's Panel (Upper Section)

A. Remove Left Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

(2) Inspect instruments for properly secured mounting.

(3) Restrain panel and release quick-release fasteners around perimeter. Carefully allow panel to eject until spring pressure is relieved.

(4) Lift panel out a few inches and disconnect lines and electrical connections.

(5) Carefully lower panel and remove from cavity.

(6) Tag and cap all lines, ports, and electrical connectors.

B. Install Left Panel

(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity and connect all lines, and electrical connectors.

(5) Carefully place panel in cavity and apply pressure evenly to panel to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure with quick-release fasteners.

(7) Perform operational test of all systems involved to determine integrity of new installation.

C. Remove Right Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

NOTE: Hydraulic oil temperature, hydraulic system pressure, hydraulic oil quantity, hydraulic pressure, tachometers, and engine vibration indicators are rack-and-panel mounted.

(2) Restrain each rack-and-panel mounted instrument by hand pressure around edge of bezel, loosen mounting clamp adjustment screw, and allow instrument to eject slowly until spring pressure is relieved.

(3) Pull instruments clear of connector (about halfway out of cutout) and tighten mounting clamp adjustment screw.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING REMOVAL OPERATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(4) Inspect instruments for properly secured mounting.

(5) Restrain panel and remove attaching screws around perimeter. Carefully allow panel to eject until spring pressure is relieved.

(6) Lift panel out a few inches, and disconnect lines and electrical connectors.

(7) Carefully lower panel and remove from cavity.

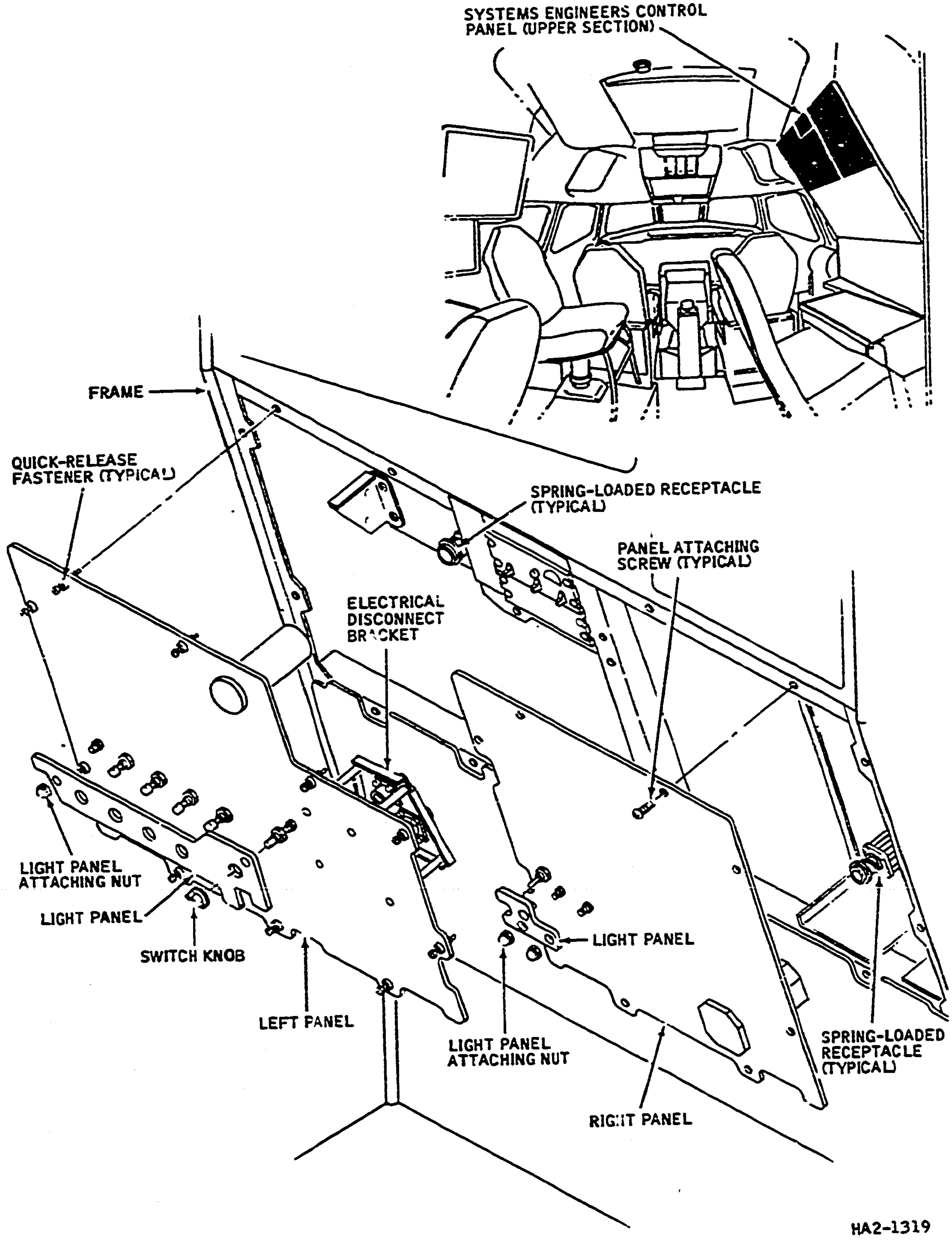
(8) Tag and cap all lines, ports, and electrical connectors.

D. Install Right Panel

(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

NOTE: Rack-and-panel mounted instruments should be clamped in extended position.



Systems Engineer's Control Panel
(Upper Section) Replacement
Figure 201

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Carefully position panel in cavity and apply pressure evenly to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure with attaching screws.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING INSTALLATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(7) Loosen clamps adjustment screws on rack-and-panel mounted instruments and press instruments into cavities.

(8) Tighten mounting clamps.

(9) Perform operational test of all systems involved to determine integrity of new installation.

SYSTEMS ENGINEER'S CONTROL PANEL (UPPER SECTION) - MAINTENANCE PRACTICES

1. General

   A. In order to remove the systems engineer's control panel (upper section), it is necessary to remove all power from the airplane and to disconnect all electrical connectors from the instruments. The electrical leads from the smaller components mounted on the panel are ganged into multiple-contact plugs mounted on a rack firmly fixed to the panel and designed to mate with spring-loaded, structure-mounted receptacles. The panel is subjected to heavy pressure, which must be relieved evenly when the panel is removed, allowing it to eject straight out, avoiding damage to the panel and electrical connectors.

   B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Systems Engineer's Panel (Upper Section)

   A. Remove Left Panel

      (1) Remove power from airplane.

      WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

      (2) Inspect instruments for properly secured mounting.

      (3) Restrain panel and release quick-release fasteners around perimeter. Carefully allow panel to eject until spring pressure is relieved.

      (4) Lift panel out a few inches and disconnect lines and electrical connections.

      (5) Carefully lower panel and remove from cavity.

      (6) Tag and cap all lines, ports, and electrical connectors.

   B. Install Left Panel

      (1) Verify power is removed from airplane.

      (2) Check that all instruments are securely clamped in panel.

      (3) Remove all caps from lines, ports, and electrical connectors.

      (4) Position panel a few inches from cavity and connect all lines, and electrical connectors.

(5) Carefully place panel in cavity and apply pressure evenly to panel to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure with quick-release fasteners.

(7) Perform operational test of all systems involved to determine integrity of new installation.

C. Remove Right Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

NOTE: Tachometers rack-and-panel mounted.

(2) Restrain each rack-and-panel mounted instrument by hand pressure around edge of bezel, loosen mounting clamp adjustment screw, and allow instrument to eject slowly until spring pressure is relieved.

(3) Pull instruments clear of connector (about halfway out of cutout) and tighten mounting clamp adjustment screw.

(4) Inspect instruments for properly secured mounting.

(5) Restrain panel and remove attaching screws around perimeter. Carefully allow panel to eject until spring pressure is relieved.

(6) Lift panel out a few inches, and disconnect lines and electrical connectors.

(7) Carefully lower panel and remove from cavity.

(8) Tag and cap all lines, ports, and electrical connectors.

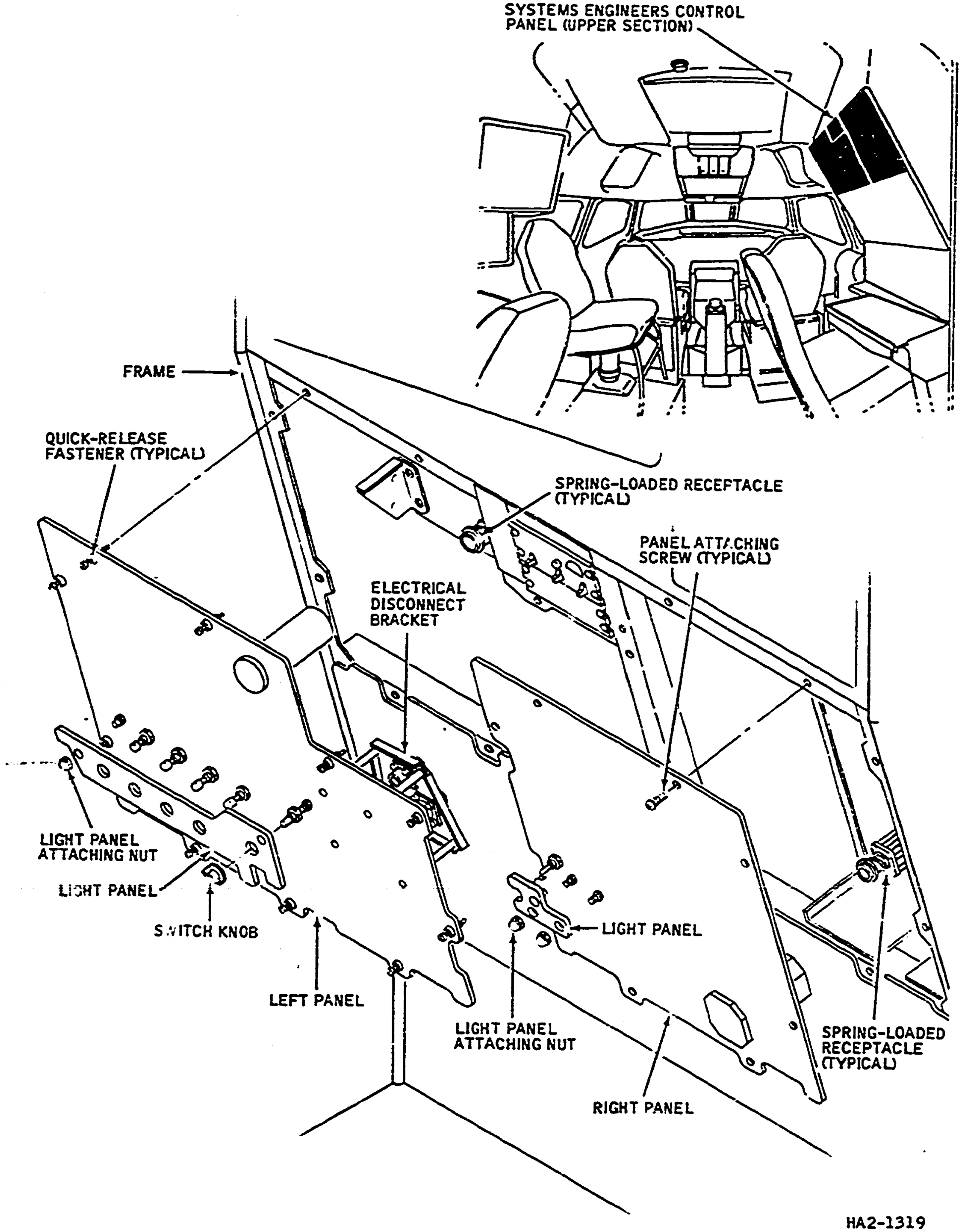
D. Install Right Panel

(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

NOTE: Rack-and-panel mounted instruments should be clamped in extended position.

(3) Remove all caps from lines, ports, and electrical connectors.



Systems Engineer's Control Panel
(Upper Section) Replacement
Figure 201

(4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Carefully position panel in cavity and apply pressure evenly to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure with attaching screws.

(7) Loosen clamps adjustment screws on rack-and-panel mounted instruments and press instruments into cavities.

(8) Tighten mounting clamps.

(9) Perform operational test of all systems involved to determine integrity of new installation.

SYSTEMS ENGINEER'S CONTROL PANEL (UPPER SECTION) - MAINTENANCE PRACTICES

1. General

A. In order to remove the systems engineer's control panel (upper section), it is necessary to remove all power from the airplane and to disconnect all electrical connectors from the instruments. The electrical leads from the smaller components mounted on the panel are ganged into multiple-contact plugs mounted on a rack firmly fixed to the panel and designed to mate with spring-loaded, structure-mounted receptacles. The panel is subjected to heavy pressure, which must be relieved evenly when the panel is removed, allowing it to eject straight out, avoiding damage to the panel and electrical connectors.

B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Systems Engineer's Panel (Upper Section)

A. Remove Left Panel

(1) Remove power from airplane.

-ING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

(2) Inspect instruments for properly secured mounting.

(3) Restrain panel and release quick-release fasteners around perimeter. Carefully allow panel to eject until spring pressure is relieved.

(4) Lift panel out a few inches and disconnect lines and electrical connectors.

(5) Carefully lower panel and remove from cavity.

(6) Tag and cap all lines, ports, and electrical connectors.

B. Install Left Panel

(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity and connect all lines, and electrical connectors.

(5) Carefully place panel in cavity and apply pressure evenly to panel to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure with quick-release fasteners.

(7) Perform operational test of all systems involved to determine integrity of new installation.

C. Remove Right Panel

(1) Remove power from airplane.

<u>WARNING</u>: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

<u>NOTE</u>: Hydraulic oil temperature, hydraulic system pressure, hydraulic oil quantity, hydraulic spoiler pressure, and engine vibration indicators are rack-and-panel mounted.

(2) Restrain each rack-and-panel mounted instrument by hand pressure around edge of bezel, loosen mounting clamp adjustment screw, and allow instrument to eject slowly until spring pressure is relieved.

(3) Pull instruments clear of connector (about halfway out of cutout) and tighten mounting clamp adjustment screw.

<u>CAUTION</u>: AVOID ROTATION OF INSTRUMENTS DURING REMOVAL OPERATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

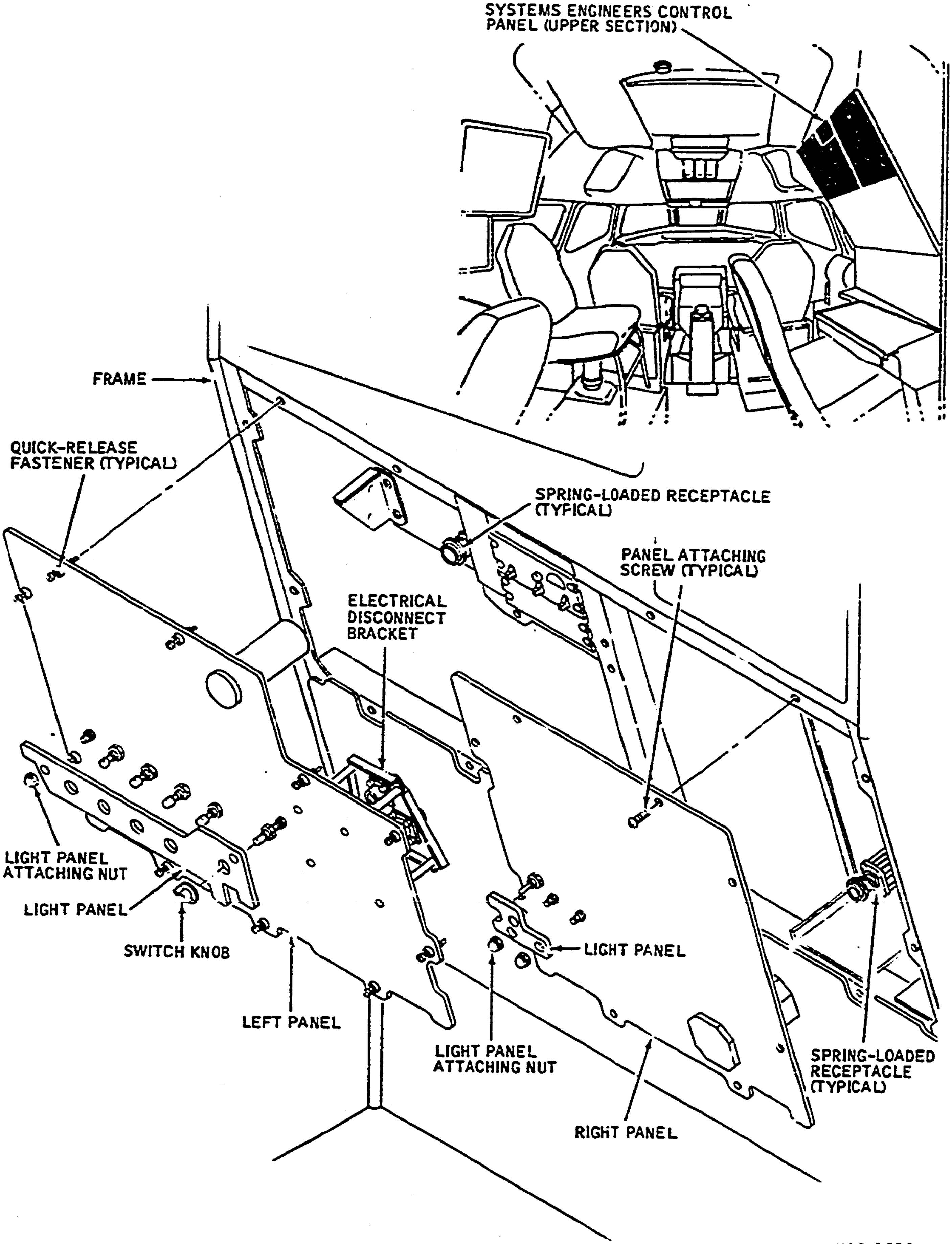
(4) Inspect instruments for properly secured mounting.

(5) Restrain panel and remove attaching screws around perimeter. Carefully allow panel to eject until spring pressure is relieved.

(6) Lift panel out a few inches, and disconnect lines and electrical connectors.

(7) Carefully lower panel and remove from cavity.

(8) Tag and cap all lines, ports, and electrical connectors.



Systems Engineer's Control Panel
(Upper Section) Replacement
Figure 201

D. Install Right Panel

(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

NOTE: Rack-and-panel mounted instruments should be clamped in extended position.

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Carefully position panel in cavity and apply pressure evenly to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure with attaching screws.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING INSTALLATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(7) Loosen clamps adjustment screws on rack-and-panel mounted instruments and press instruments into cavities.

(8) Tighten mounting clamps.

(9) Perform operational test of all systems involved to determine integrity of new installation.

SYSTEMS ENGINEER'S CONTROL PANEL (UPPER SECTION) - MAINTENANCE PRACTICES

1. General

A. In order to remove the systems engineer's control panel (upper section), it is necessary to remove all power from the airplane and to disconnect all electrical connectors from the panel. The electrical leads from the smaller components mounted on the panel are ganged into multiple-contact plugs mounted on a rack firmly fixed to the panel and designed to mate with spring-loaded, structure-mounted receptacles. The panel is subjected to heavy pressure, which must be relieved evenly when the panel is removed, allowing it to eject straight out, avoiding damage to the panel and electrical connectors.

B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Systems Engineer's Panel (Upper Section)

A. Remove Left Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

(2) Inspect instruments for properly secured mounting.

(3) Restrain panel and release quick-release fasteners around perimeter. Carefully allow panel to eject until spring pressure is relieved.

(4) Lift panel out a few inches and disconnect lines and electrical connectors.

(5) Carefully lower panel and remove from cavity.

(6) Tag and cap all lines, ports, and electrical connectors.

B. Install Left Panel

(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Carefully place panel in cavity and apply pressure evenly to panel to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure with quick-release fasteners.

(7) Perform operational test of all systems involved to determine integrity of new installation.

C. Remove Right Panel

(1) Remove power from airplane.

<u>WARNING</u>: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

(2) Inspect instruments for properly secured mounting.

(3) Remove attaching screws around perimeter of panel.

(4) Lift panel out a few inches, and disconnect lines and electrical connectors.

(5) Carefully lower panel and remove from cavity.

(6) Tag and cap all lines, ports, and electrical connectors.

D. Install Right Panel

(1) Verify power is removed from airplane.

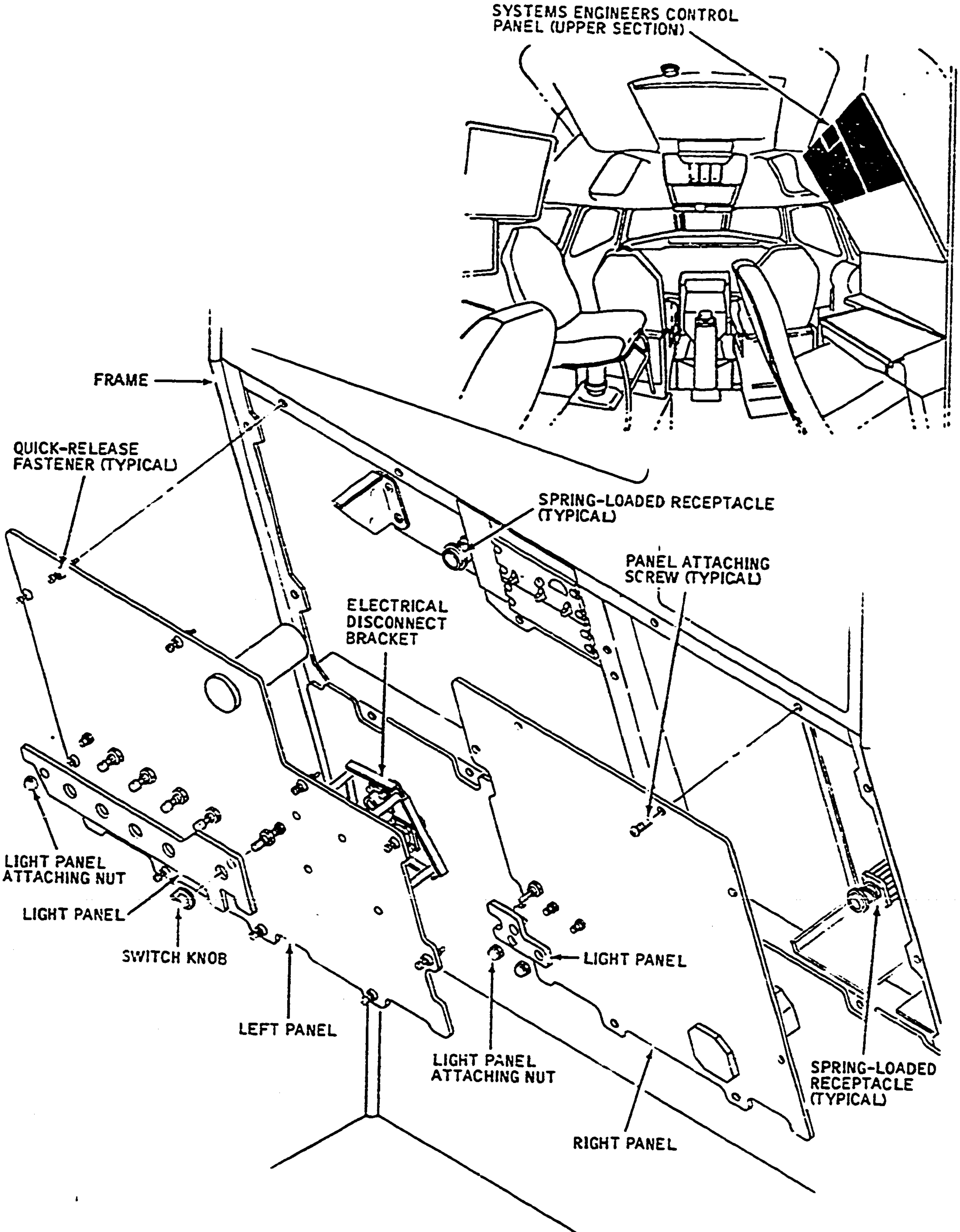
(2) Check that all instruments are securely clamped in panel.

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity and connect all lines and electrical connectors.

(5) Position panel in cavity and install attaching screws.

(6) Perform operational test of all systems involved to determine integrity of new installation.



Systems Engineer's Control Panel
(Upper Section) Replacement
Figure 201

SYSTEMS ENGINEER'S CONTROL PANEL (UPPER SECTION) - MAINTENANCE PRACTICES

1. General

   A. In order to remove the systems engineer's control panel (upper section), it is necessary to remove all power from the airplane and to disconnect all electrical connectors from the instruments. The electrical leads from the smaller components mounted on the panel are ganged into multiple-contact plugs mounted on a rack firmly fixed to the panel and designed to mate with spring-loaded, structure-mounted receptacles. The panel is subjected to heavy pressure, which must be relieved evenly when the panel is removed, allowing it to eject straight out, avoiding damage to the panel and electrical connectors.

   B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Systems Engineer's Panel (Upper Section)

   A. Remove Left Panel

      (1) Remove power from airplane.

      WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

      (2) Inspect instruments for properly secured mounting.

      (3) Restrain panel and release quick-release fasteners around perimeter. Carefully allow panel to eject until spring pressure is relieved.

      (4) Lift panel out a few inches and disconnect lines and electrical connectors.

      (5) Carefully lower panel and remove from cavity.

      (6) Tag and cap all lines, ports, and electrical connectors.

   B. Install Left Panel

      (1) Verify power is removed from airplane.

      (2) Check that all instruments are securely clamped in panel.

      (3) Remove all caps from lines, ports, and electrical connectors.

      (4) Position panel a few inches from cavity and connect all lines, and electrical connectors.

(5) Carefully place panel in cavity and apply pressure evenly to panel to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure with quick-release fasteners.

(7) Perform operational test of all systems involved to determine integrity of new installation.

C. Remove Right Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

NOTE: Hydraulic oil temperature, hydraulic system pressure, hydraulic brake pressure, hydraulic oil quantity, spoiler hydraulic pressure, and air brake pressure indicators are rack-and-panel mounted.

(2) Restrain each rack-and-panel mounted instrument by hand pressure around edge of bezel, loosen mounting clamp adjustment screw, and allow instrument to eject slowly until spring pressure is relieved.

(3) Pull instruments clear of connector (about halfway out of cutout) and tighten mounting clamp adjustment screw.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING REMOVAL OPERATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(4) Inspect instruments for properly secured mounting.

(5) Restrain panel and remove attaching screws around perimeter. Carefully allow panel to eject until spring pressure is relieved.

(6) Lift panel out a few inches, and disconnect lines and electrical connectors.

(7) Carefully lower panel and remove from cavity.

(8) Tag and cap all lines, ports, and electrical connectors.

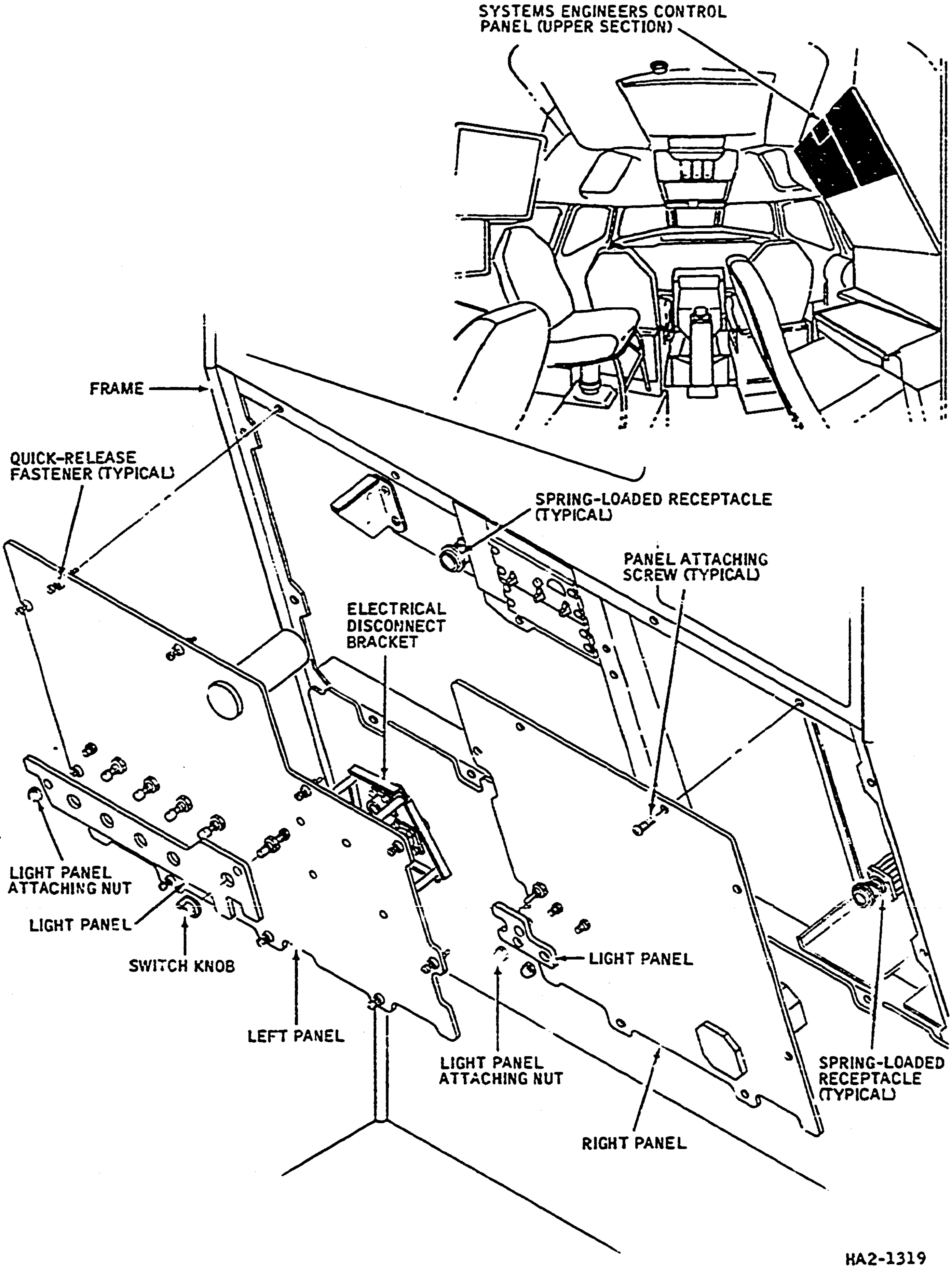
D. Install Right Panel

(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

NOTE: Rack-and-panel mounted instruments should be clamped in extended position.

(3) Remove all caps from lines, ports, and electrical connectors.



Systems Engineer's Control Panel
(Upper Section) Replacement
Figure 201

(4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Carefully position panel in cavity and apply pressure evenly to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure with attaching screws.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING INSTALLATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(7) Loosen clamps adjustment screws on rack-and-panel mounted instruments and press instruments into cavities.

(8) Tighten mounting clamps.

(9) Perform operational test of all systems involved to determine integrity of new installation.

SYSTEMS ENGINEER'S CONTROL PANEL (UPPER SECTION) - MAINTENANCE PRACTICES

1. General

   A. In order to remove the systems engineer's control panel (upper section), it is necessary to remove all power from the airplane and to disconnect all electrical connectors from the panel. The electrical leads from the smaller components mounted on the panel are ganged into multiple-contact plugs mounted on a rack firmly fixed to the panel and designed to mate with spring-loaded, structure-mounted receptacles. The panel is subjected to heavy pressure, which must be relieved evenly when the panel is removed, allowing it to eject straight out, avoiding damage to the panel and electrical connectors.

   B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Systems Engineer's Panel (Upper Section)

   A. Remove Left Panel

      (1) Remove power from airplane.

      WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

      (2) Inspect instruments for properly secured mounting.

      (3) Restrain panel and release quick-release fasteners around perimeter. Carefully allow panel to eject until spring pressure is relieved.

      (4) Lift panel out a few inches and disconnect lines and electrical connectors.

      (5) Carefully lower panel and remove from cavity.

      (6) Tag and cap all lines, ports, and electrical connectors.

   B. Install Left Panel

      (1) Verify power is removed from airplane.

      (2) Check that all instruments are securely clamped in panel.

      (3) Remove all caps from lines, ports, and electrical connectors.

      (4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Carefully place panel in cavity and apply pressure evenly to panel to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure with quick-release fasteners.

(7) Perform operational test of all systems involved to determine integrity of new installation.

C. Remove Right Panel

(1) Remove power from airplane.

<u>WARNING:</u> TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

<u>NOTE:</u> Hydraulic oil temperature, hydraulic system pressure, hydraulic brake pressure, hydraulic oil quantity, hydraulic spoiler pressure, oil brake pressure and tachometer indicators are rack-and-panel mounted.

(2) Restrain each rack-and-panel mounted instrument by hand pressure around edge of bezel, loosen mounting clamp adjustment screw, and allow instrument to eject slowly until spring pressure is relieved.

(3) Pull instruments clear of connector (about halfway out of cutout) and tighten mounting clamp adjustment screw.

<u>CAUTION:</u> AVOID ROTATION OF INSTRUMENTS DURING REMOVAL OPERATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(4) Inspect instruments for properly secured mounting.

(5) Restrain panel and remove attaching screws around perimeter. Carefully allow panel to eject until spring pressure is relieved.

(6) Lift panel out a few inches, and disconnect lines and electrical connectors.

(7) Carefully lower panel and remove from cavity.

(8) Tag and cap all lines, ports, and electrical connectors.

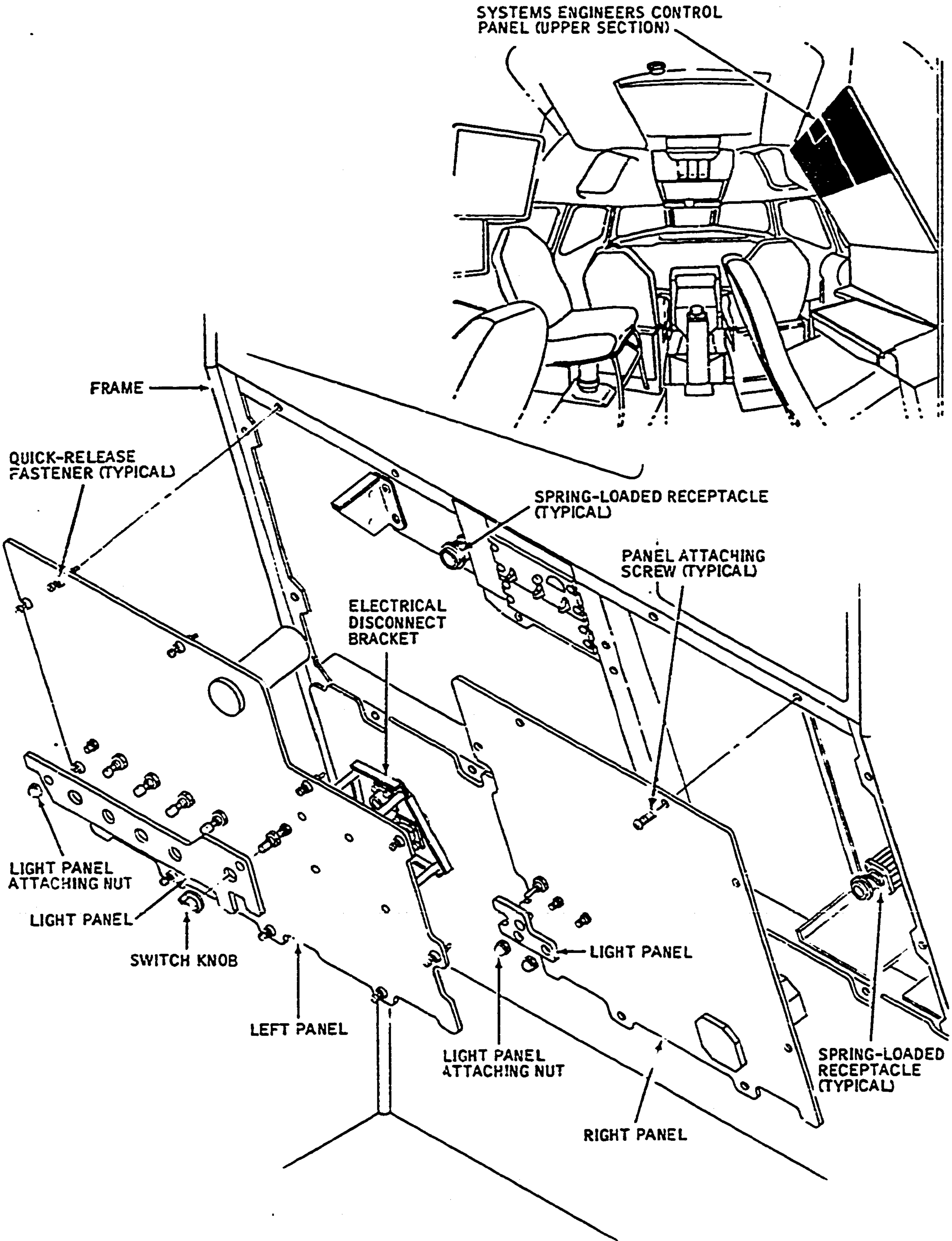
D. Install Right Panel

(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

<u>NOTE:</u> Rack-and-panel mounted instruments should be clamped in extended position.

(3) Remove all caps from lines, ports, and electrical connectors.



Systems Engineer's Control Panel
(Upper Section) Replacement
Figure 201

(4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Carefully position panel in cavity and apply pressure evenly to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure with attaching screws.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING INSTALLATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(7) Loosen clamp adjustment screws on rack-and-panel mounted instruments and press instruments into cavities.

(8) Tighten mounting clamps.

(9) Perform operational test of all systems involved to determine integrity of new installation.

SYSTEMS ENGINEER'S CONTROL PANEL (UPPER SECTION) - MAINTENANCE PRACTICES

1. General

A. In order to remove the systems engineer's control panel (upper section), it is necessary to remove all power from the airplane and to disconnect all electrical connectors from the instruments. The electrical leads from the smaller components mounted on the panel are ganged into multiple-contact plugs mounted on a rack firmly fixed to the panel and designed to mate with spring-loaded, structure-mounted receptacles. The panel is subjected to heavy pressure, which must be relieved evenly when the panel is removed, allowing it to eject straight out, avoiding damage to the panel and electrical connectors.

B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Systems Engineer's Panel (Upper Section)

A. Remove Left Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

(2) Inspect instruments for properly secured mounting.

(3) Restrain panel and release quick-release fasteners around perimeter. Carefully allow panel to eject until spring pressure is relieved.

(4) Lift panel out a few inches and disconnect lines and electrical connections.

(5) Carefully lower panel and remove from cavity.

(6) Tag and cap all lines, ports, and electrical connectors.

B. Install Left Panel

(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity and connect all lines, and electrical connectors.

(5) Carefully place panel in cavity and apply pressure evenly to panel to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure with quick-release fasteners.

(7) Perform operational test of all systems involved to determine integrity of new installation.

C. Remove Right Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

(2) Inspect instruments for properly secured mounting.

(3) Remove attaching screws around perimeter of panel.

(4) Lift panel out a few inches and disconnect lines and electrical connectors.

(5) Carefully lower panel and remove from cavity.

(6) Tag and cap all lines, ports, and electrical connectors.

D. Install Right Panel

(1) Verify power is removed from airplane.

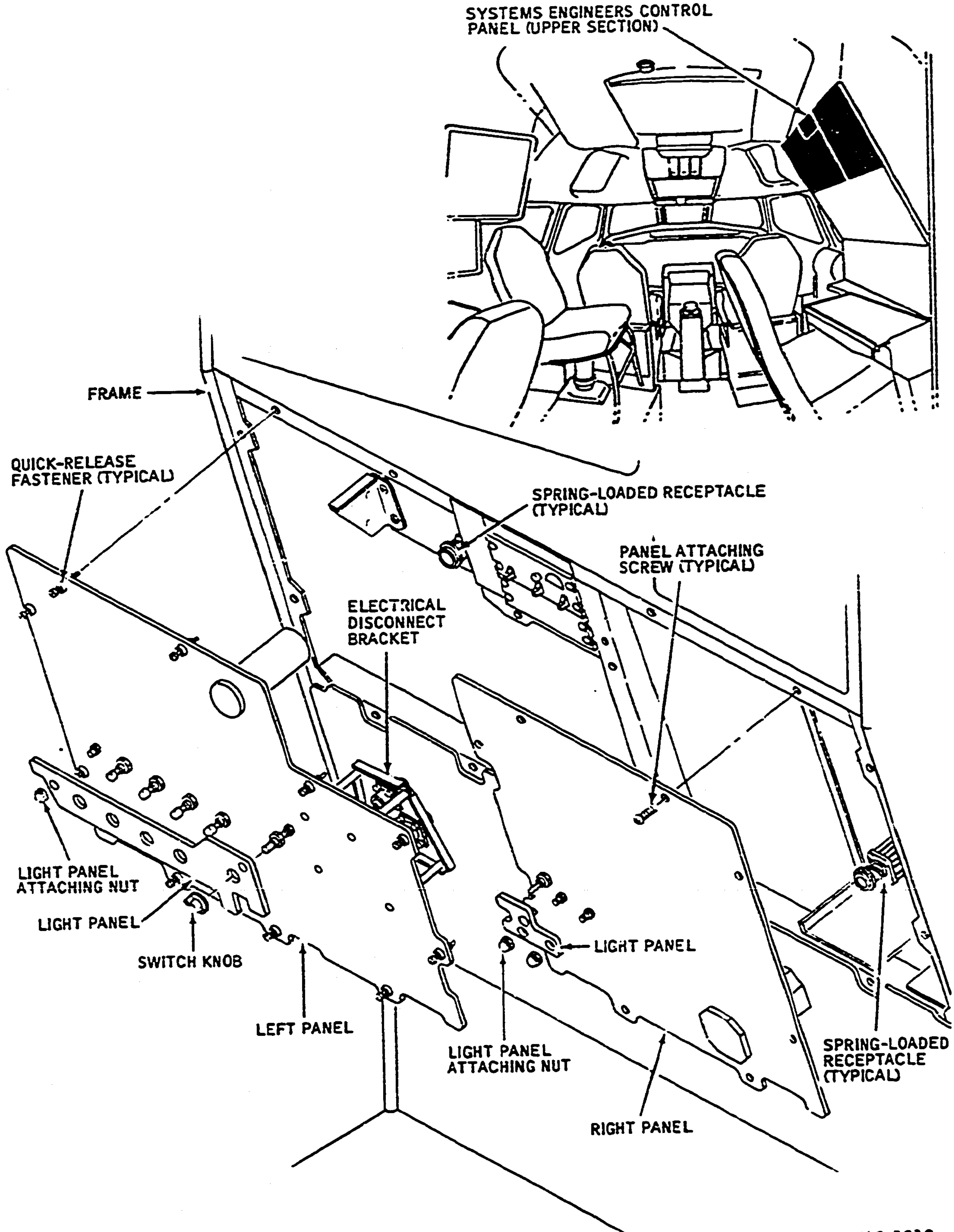
(2) Check that all instruments are securely clamped in panel.

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Position panel in cavity and install attaching screws.

(6) Perform operational test of all systems involved to determine integrity of new installation.



Systems Engineer's Control Panel
(Upper Section) Replacement
Figure 201

SYSTEMS ENGINEER'S CONTROL PANEL (UPPER SECTION) - MAINTENANCE PRACTICES

1. General

   A. In order to remove the systems engineer's control panel (upper section), it is necessary to remove all power from the airplane and to disconnect all electrical connectors from the panel. The electrical leads from the smaller components mounted on the panel are ganged into multiple-contact plugs mounted on a rack firmly fixed to the panel and designed to mate with spring-loaded, structure-mounted receptacles. The panel is subjected to heavy pressure, which must be relieved evenly when the panel is removed, allowing it to eject straight out, avoiding damage to the panel and electrical connectors.

   B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Systems Engineer's Panel (Upper Section)

   A. Remove Left Panel

      (1) Remove power from airplane.

      WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

      (2) Inspect instruments for properly secured mounting.

      (3) Restrain panel and release quick-release fasteners around perimeter. Carefully allow panel to eject until spring pressure is relieved.

      (4) Lift panel out a few inches and disconnect lines and electrical connectors.

      (5) Carefully lower panel and remove from cavity.

      (6) Tag and cap all lines, ports, and electrical connectors.

   B. Install Left Panel

      (1) Verify power is removed from airplane.

      (2) Check that all insturments are securely clamped in panel.

      (3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Carefully place panel in cavity and apply pressure evenly to panel to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure with quick-release fasteners.

(7) Perform operational test of all systems involved to determine integrity of new installation.

C. Remove Right Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

NOTE: Hydraulic oil temperature, hydraulic system pressure, hydraulic brake pressure, hydraulic oil quantity, hydraulic spoiler pressure, air brake pressure and engine vibration indicators are rack-and-panel mounted.

(2) Restrain each rack-and-panel mounted instrument by hand pressure around edge of bezel, loosen mounting clamp adjustment screw, and allow instruments to eject slowly until spring pressure is relieved.

(3) Pull instruments clear of connector (about halfway out of cutout) and tighten mounting clamp adjustment screw.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING REMOVAL OPERATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

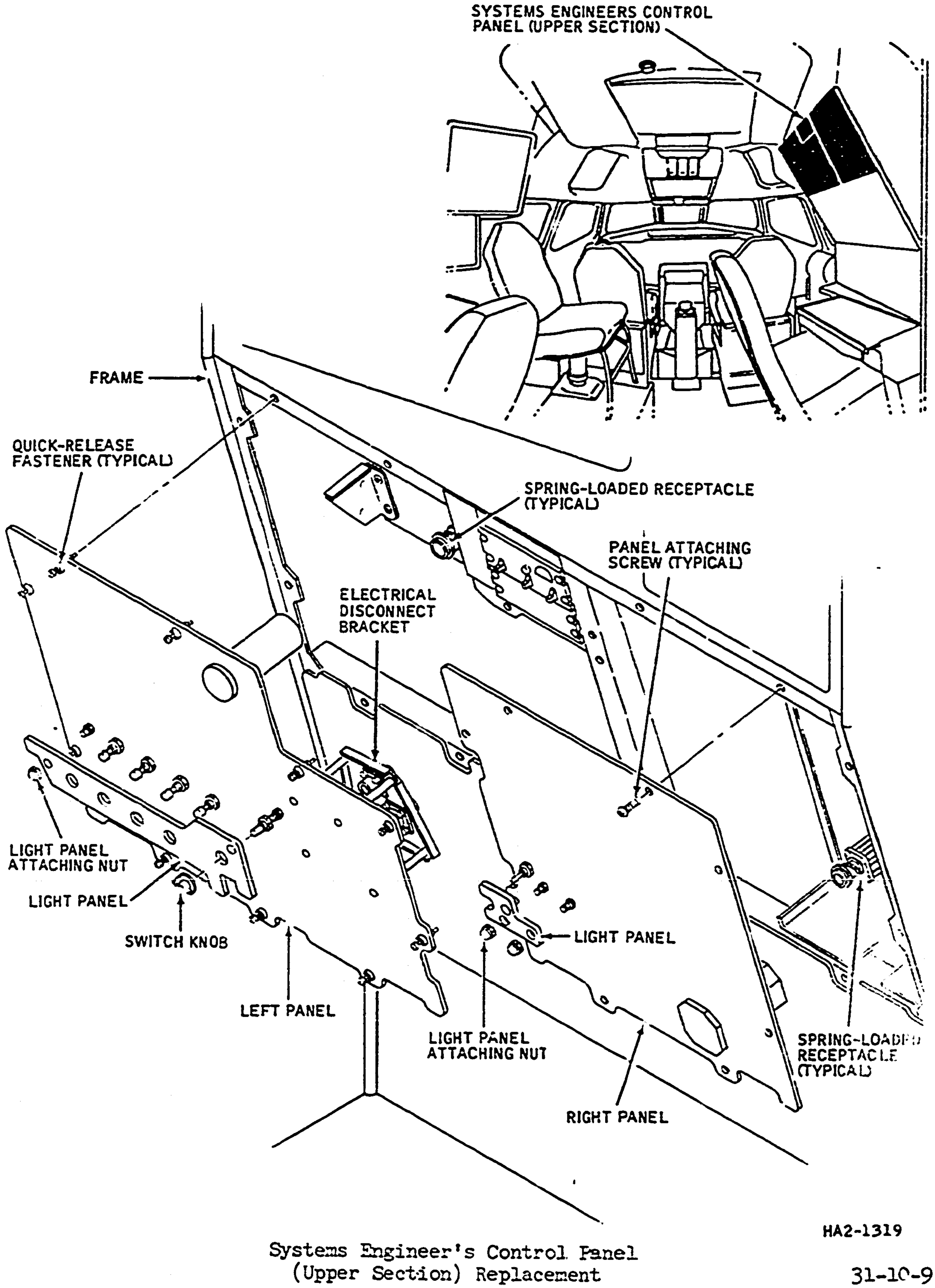
(4) Inspect instruments for properly secured mounting.

(5) Restrain panel and remove attaching screws around perimeter. Carefully allow panel to eject until spring pressure is relieved.

(6) Lift panel out a few inches, and disconnect lines and electrical connectors.

(7) Carefully lower panel and remove from cavity.

(8) Tag and cap all lines, ports, and electrical connectors.



Systems Engineer's Control Panel
(Upper Section) Replacement
Figure 201

D. Install Right Panel

(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

NOTE: Rack-and-panel mounted instruments should be clamped in extended position.

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Carefully position panel in cavity and apply pressure evenly to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure with attaching screws.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING INSTALLATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(7) Loosen clamp adjustment screws on rack-and-panel mounted instruments and press instruments into cavities.

(8) Tighten mounting clamps.

(9) Perform operational test of all systems involved to determine integrity of new installation.

SYSTEMS ENGINEER'S CONTROL PANEL (UPPER SECTION) - MAINTENANCE PRACTICES

1. General

A. In order to remove the systems engineer's control panel (upper section), it is necessary to remove all power from the airplane and to disconnect all electrical connectors from the instruments. The electrical leads from the smaller components mounted on the panel are ganged into multiple-contact plugs mounted on a rack firmly fixed to the panel and designed to mate with spring-loaded, structure-mounted receptacles. The panel is subjected to heavy pressure, which must be relieved evenly when the panel is removed, allowing it to eject straight out, avoiding damage to the panel and electrical connectors.

B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Systems Engineer's Panel (Upper Section)

A. Remove Left Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

(2) Inspect instruments for properly secured mounting.

(3) Restrain panel and release quick-release fasteners around perimeter. Carefully allow panel to eject until spring pressure is relieved.

(4) Lift panel out a few inches and disconnect lines and electrical connections.

(5) Carefully lower panel and remove from cavity.

(6) Tag and cap all lines, ports, and electrical connectors.

B. Install Left Panel

(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity and connect all lines, and electrical connectors.

(5) Carefully place panel in cavity and apply pressure evenly to panel to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure with quick-release fasteners.

(7) Perform operational test of all systems involved to determine integrity of new installation.

C. Remove Right Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

NOTE: Hydraulic oil temperature, hydraulic system pressure, hydraulic oil quantity, spoiler hydraulic pressure, engine vibration, and fuel flow indicators are rack-and-panel mounted.

(2) Restrain each rack-and-panel mounted instrument by hand pressure around edge of bezel, loosen mounting clamp adjustment screw, and allow instrument to eject slowly until spring pressure is relieved.

(3) Pull instruments clear of connector (about halfway out of cutout) and tighten mounting clamp adjustment screw.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING REMOVAL OPERATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(4) Inspect instruments for properly secured mounting.

(5) Restrain panel and remove attaching screws around perimeter. Carefully allow panel to eject until spring pressure is relieved.

(6) Lift panel out a few inches, and disconnect lines and electrical connectors.

(7) Carefully lower panel and remove from cavity.

(8) Tag and cap all lines, ports, and electrical connectors.

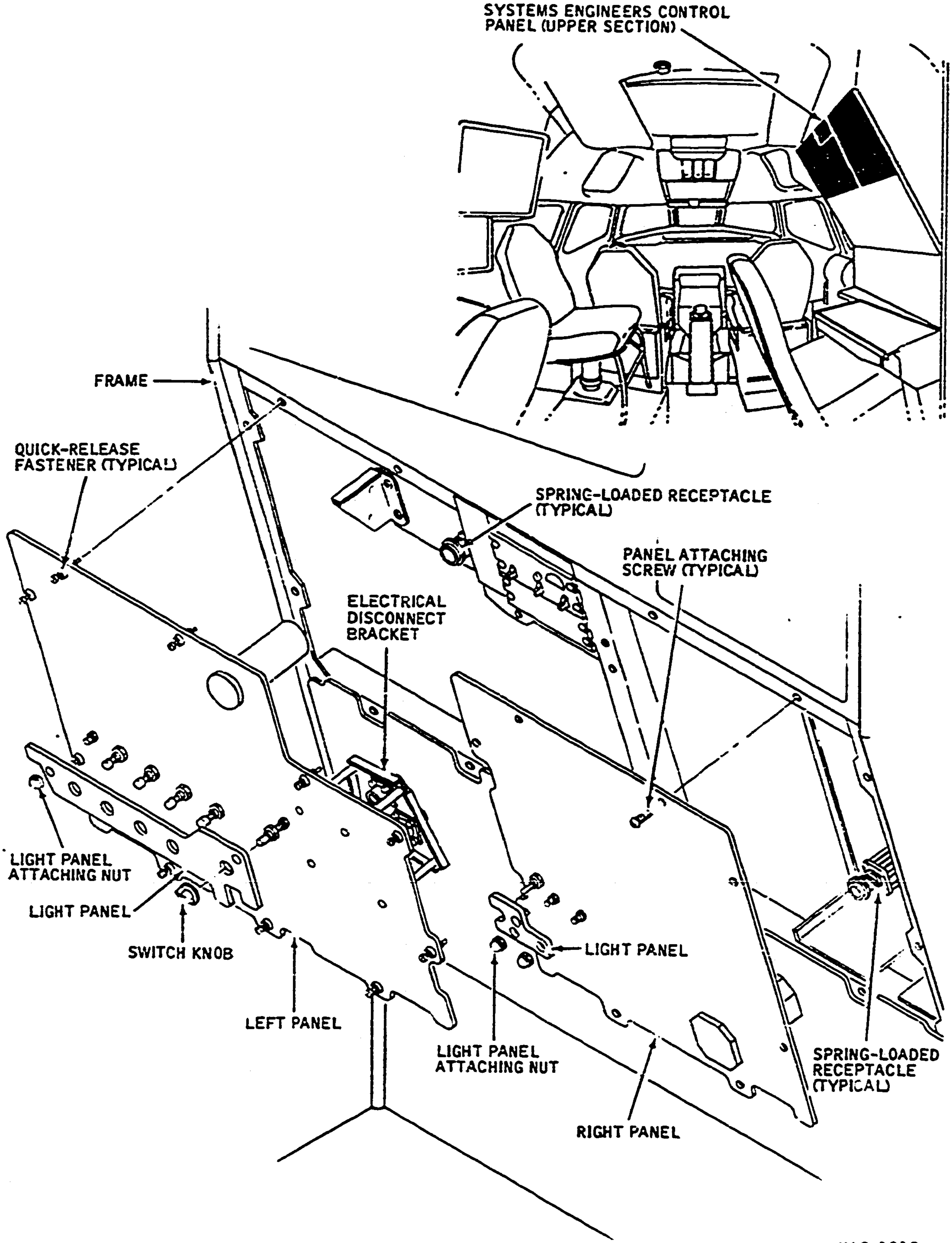
D. Install Right Panel

(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

NOTE: Rack-and-panel mounted instruments should be clamped in extended position.

(3) Remove all caps from lines, ports, and electrical connectors.



Systems Engineer's Control Panel
(Upper Section) Replacement
Figure 201

(4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Carefully position panel in cavity and apply pressure evenly to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

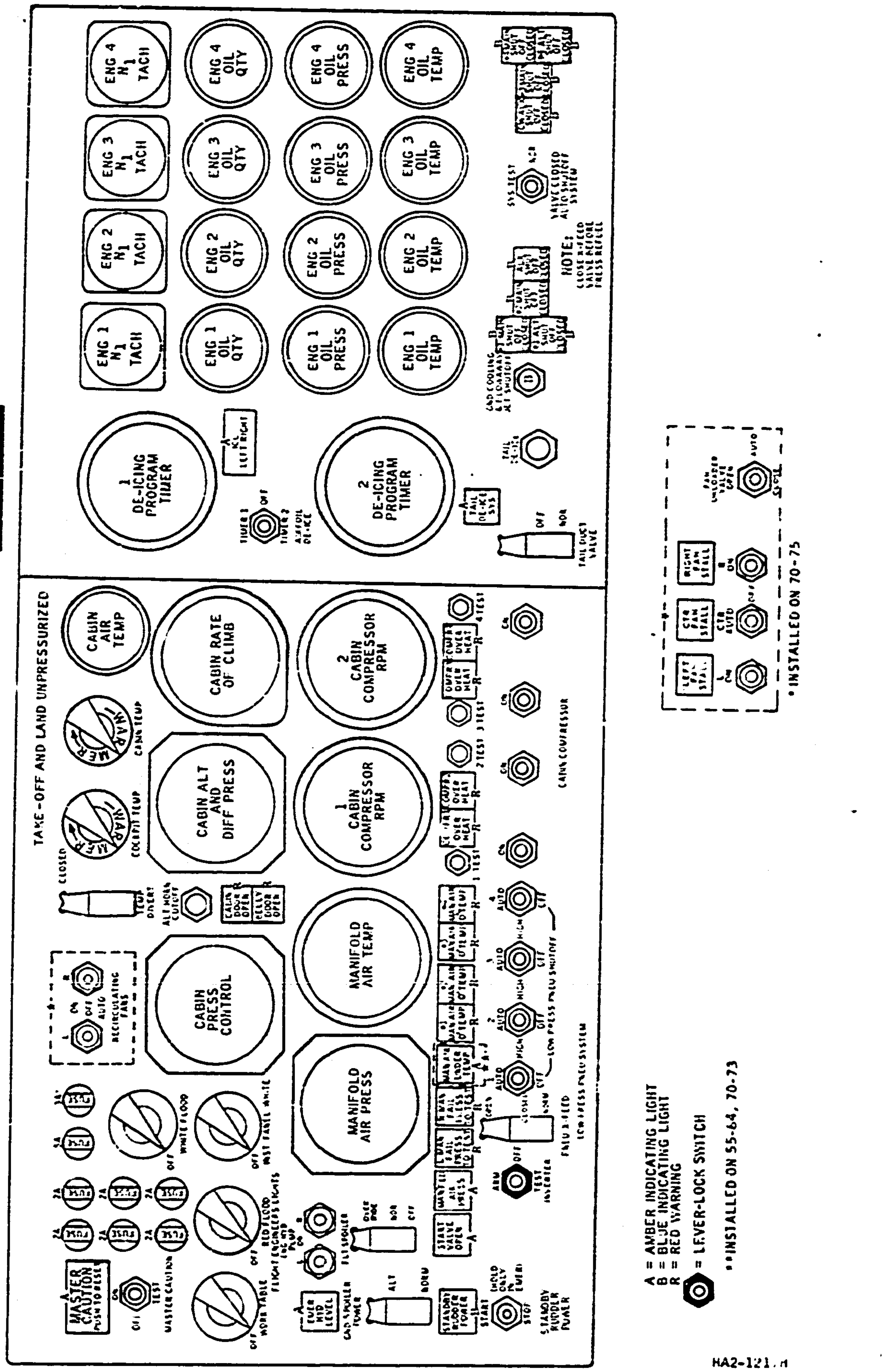
(6) Secure with attaching screws.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING INSTALLATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(7) Loosen clamps adjustment screws on rack-and-panel mounted instruments and press instruments into cavities.

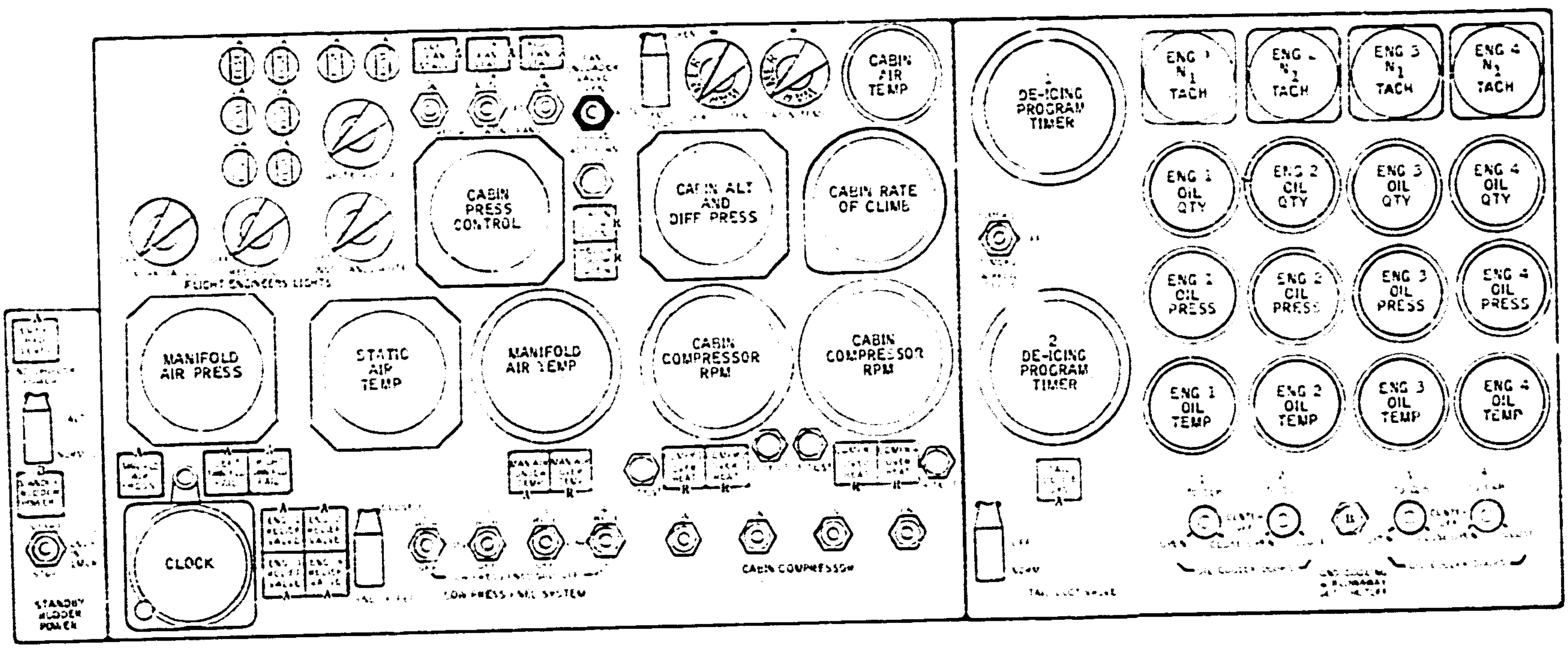
(8) Tighten mounting clamps.

(9) Perform operational test of all systems involved to determine integrity of new installation.



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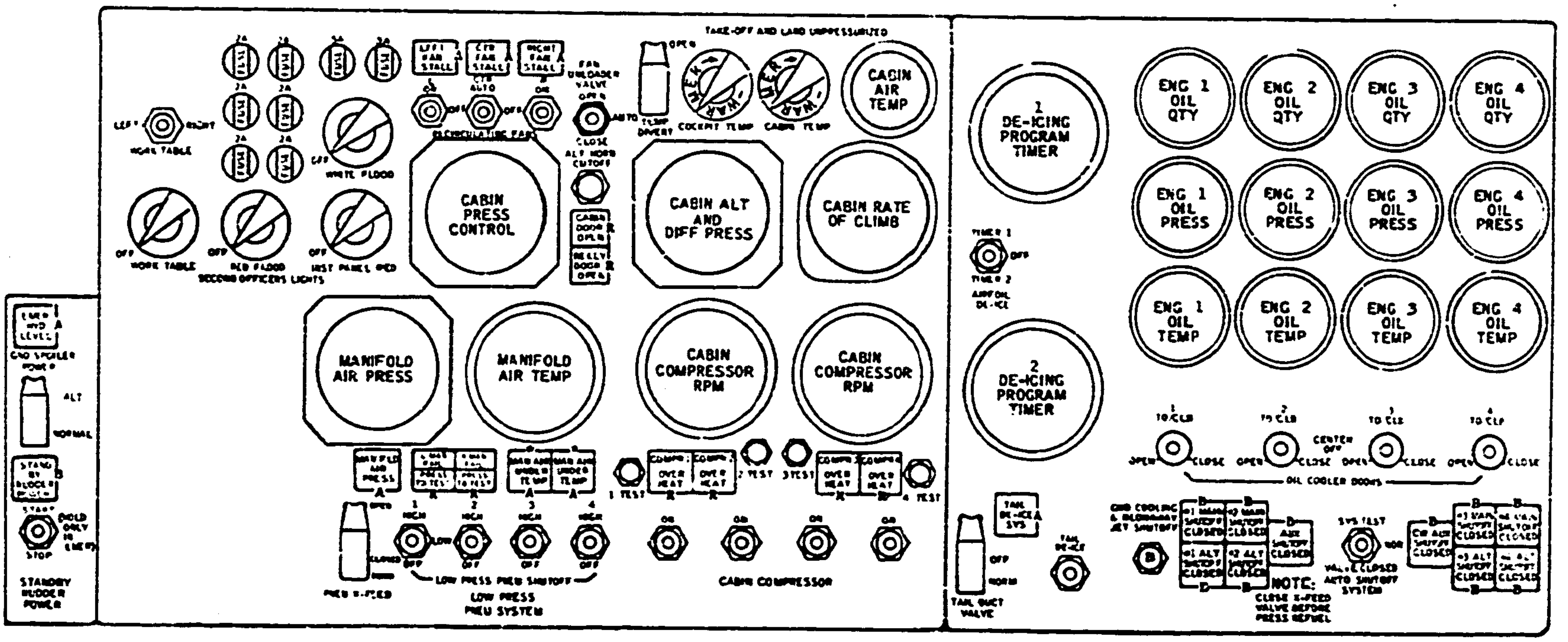
Systems Engineer's Control Panel
(Center Section)
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
= LEVER-LOCK SWITCH

HAZ-1259A

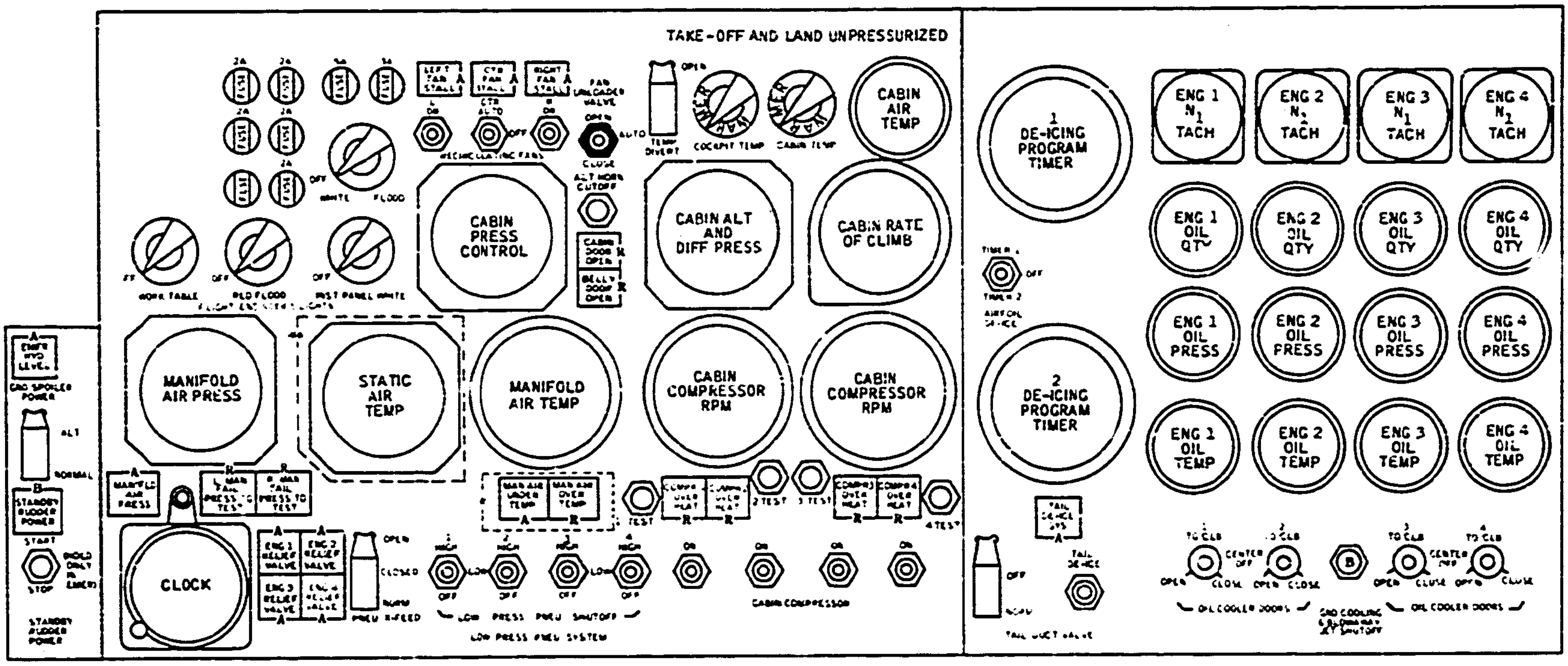
Systems Engineer's Control Panel
(Center Section)
Figure 1



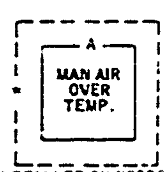
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
(symbol) = LEVER-LOCK SWITCH
* NOT INSTALLED ON AIRPLANES WITH S/B 36-38 INCORPORATED

HA2-1331C

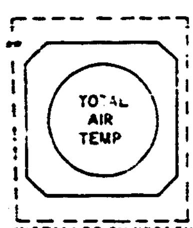
Systems Engineer's Control Panel
(Center Section)
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
= LEVER-LOCK SWITCH

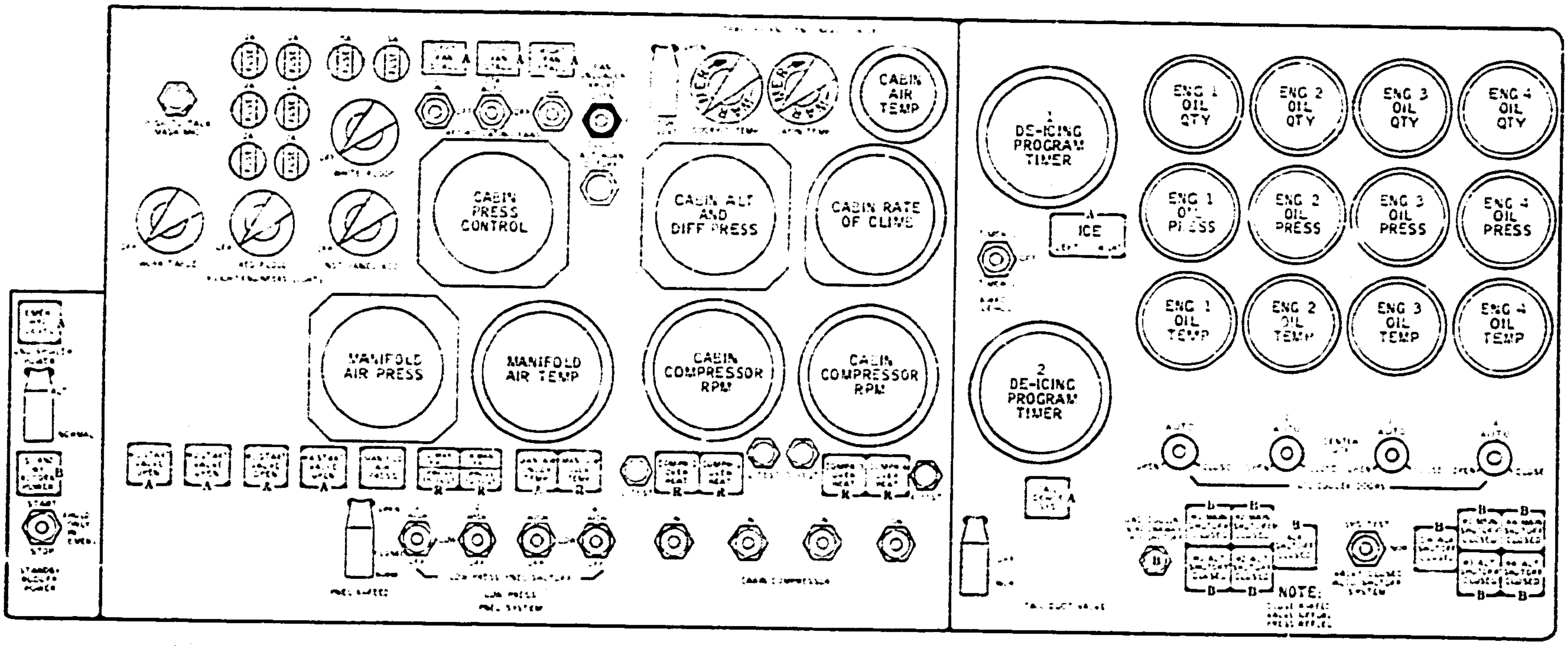


INSTALLED ON N8098U-N8099U



INSTALLED ON N8095U-N8099U

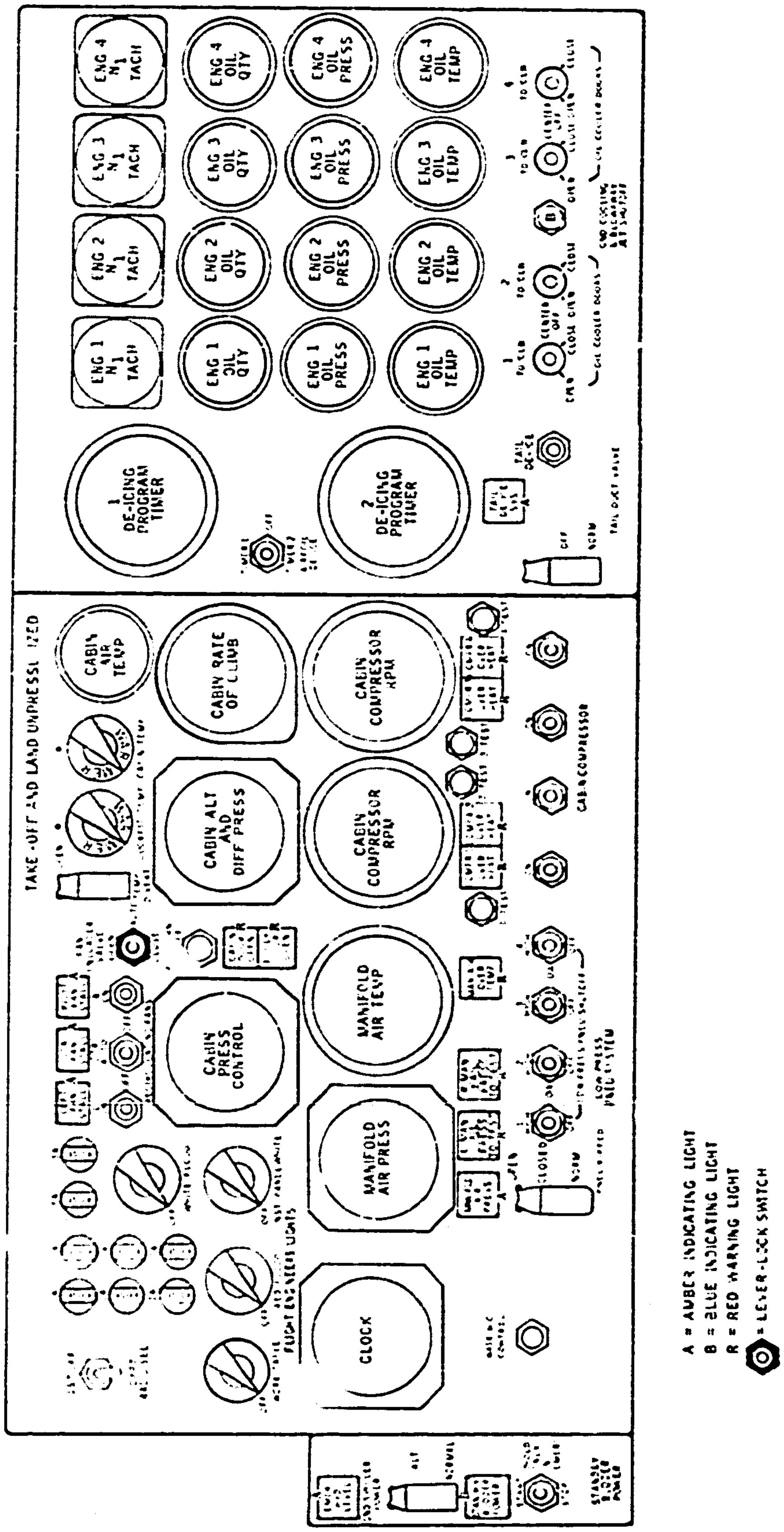
Systems Engineer's Control Panel
(Center Section)
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
(symbol) = LEVER-LOCK SWITCH

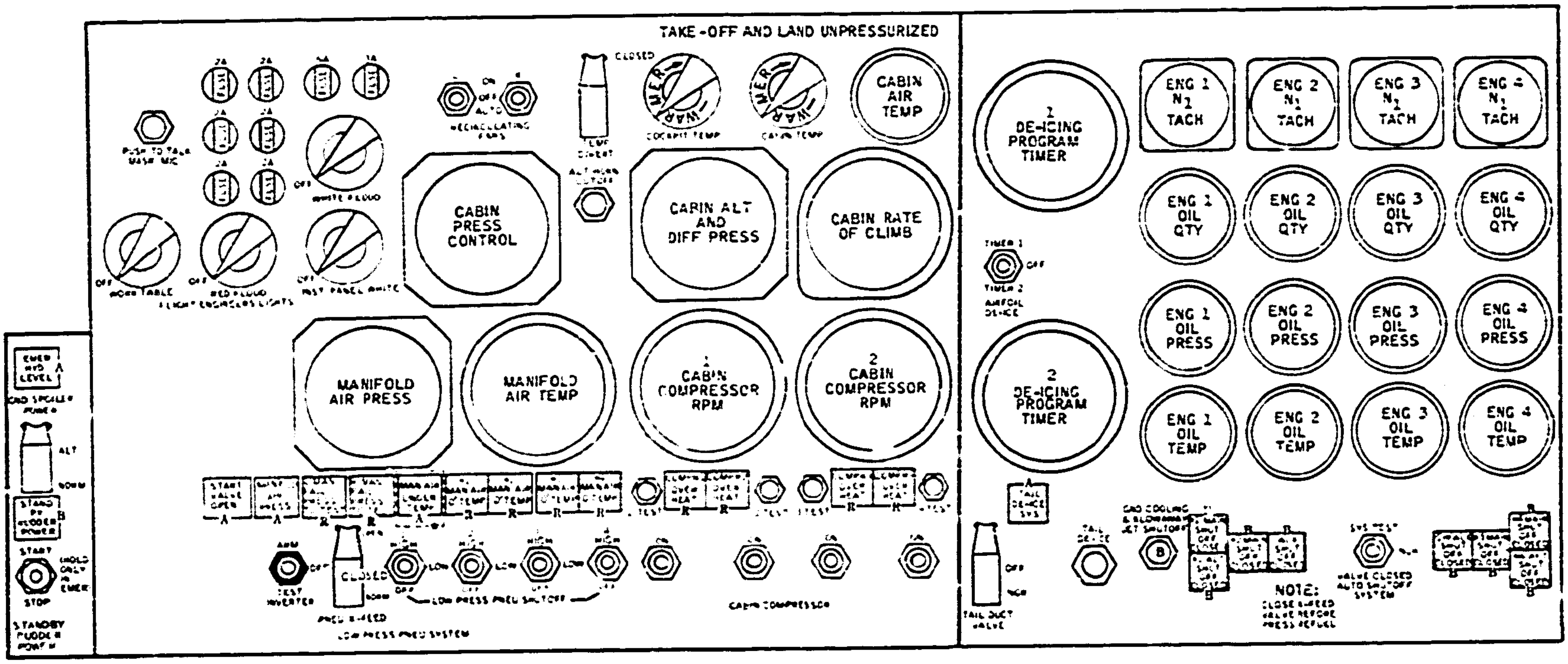
HA2-2364B

Systems Engineer's Control Panel
(Center Section)
Figure 1



HA2-2973C

Systems Engineer's Control Panel
(Center Section)
Figure 1



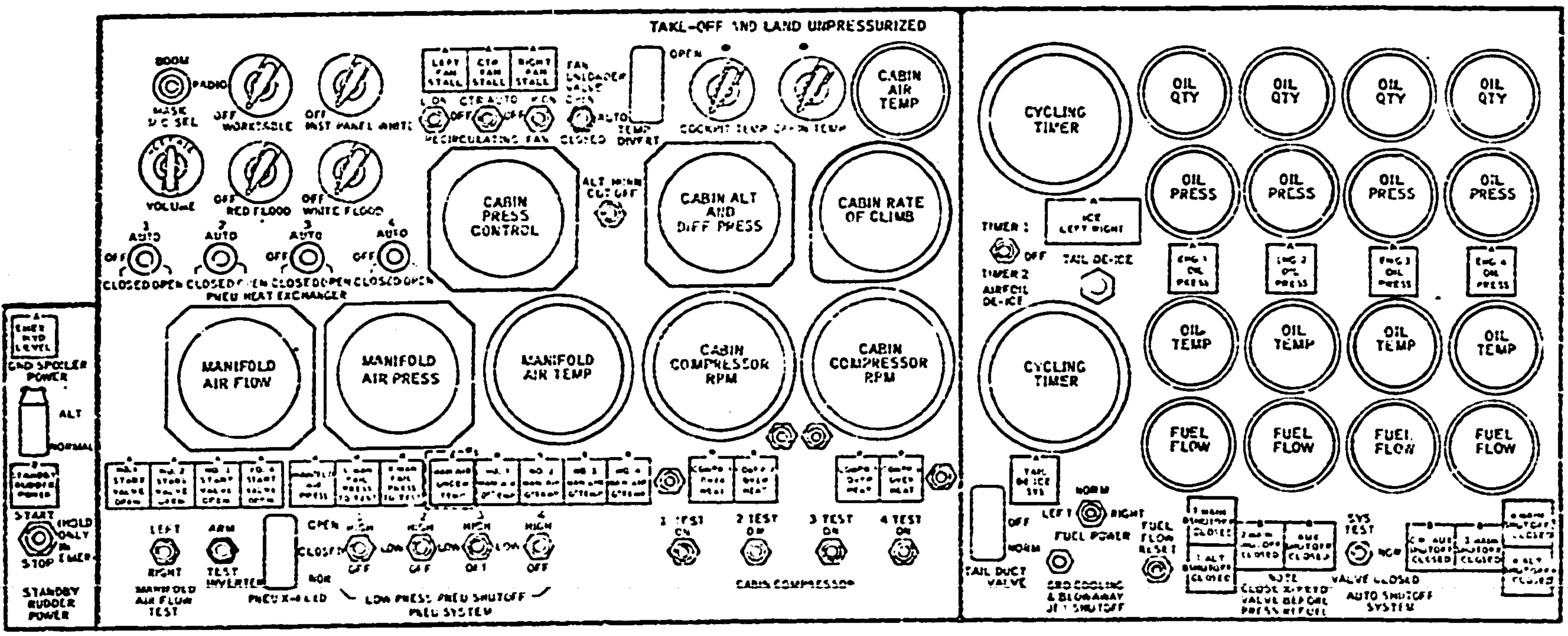
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R - RED WARNING LIGHT

= LEVER-LOCK SWITCH

* INSTALLED ON N1803-N1807

HA2-2974A

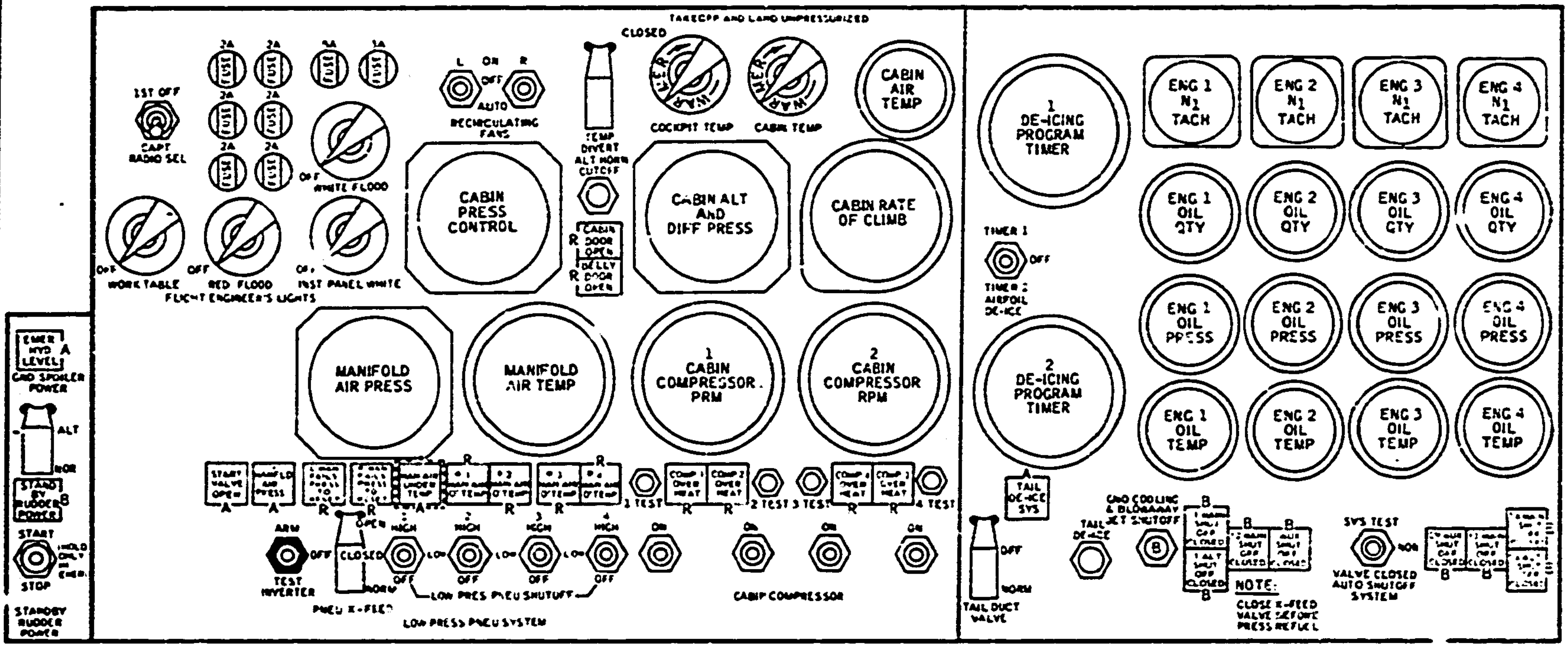
Systems Engineer's Control Panel
(Center Section)
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
= LEVER LOCK SWITCH
* = NOT INSTALLED ON PH-DEF—PH-DEH, PH-DEK—PH-DEM AND AIRPLANES WITH S/B 36-38 INCORPORATED

HA2-3065H

Systems Engineer's Control Panel (Center Section)
Figure 1



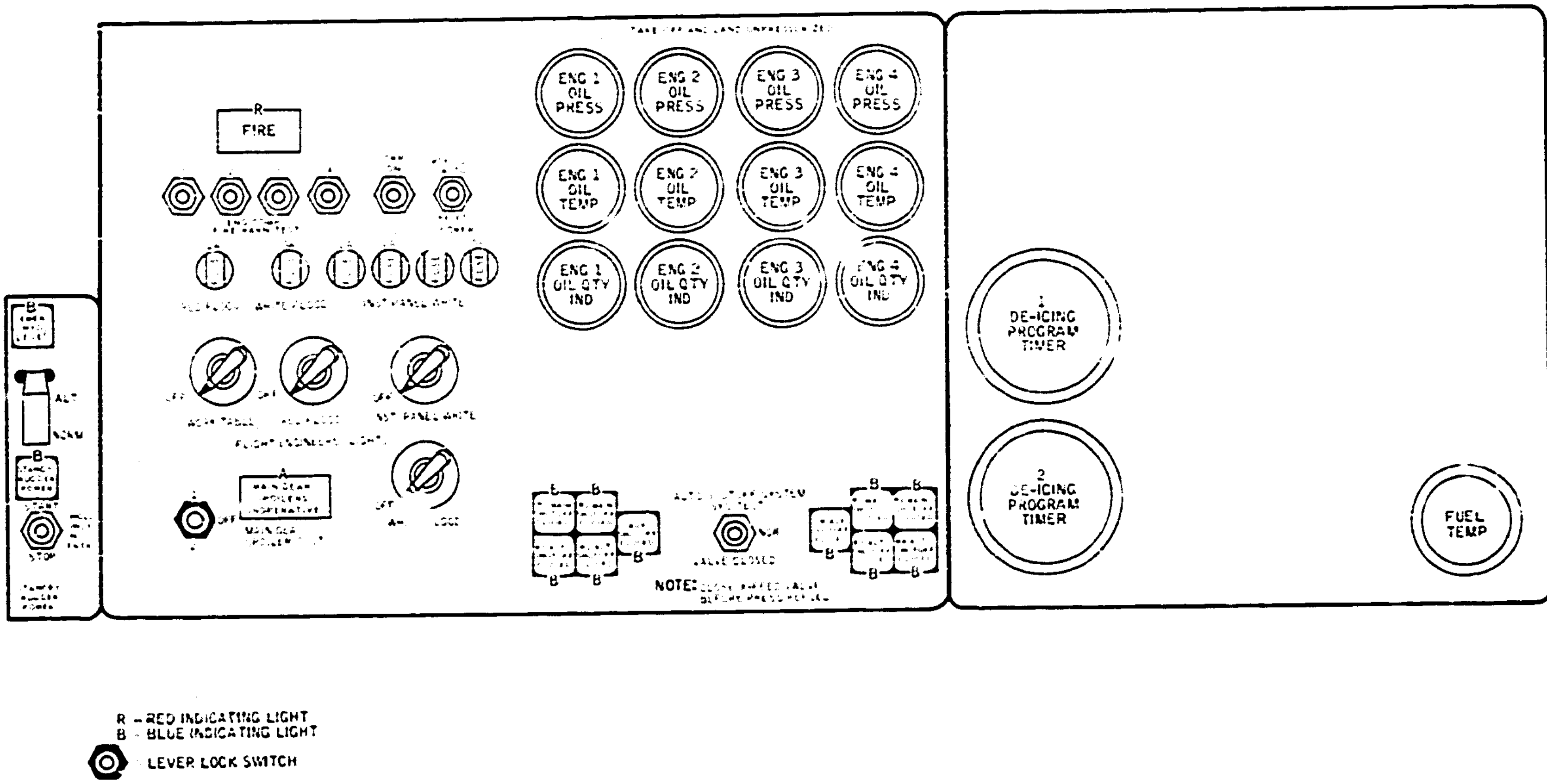
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED INDICATING LIGHT

= LEVER-LOCK SWITCH

* NOT INSTALLED ON I-DIWW AND SUBS

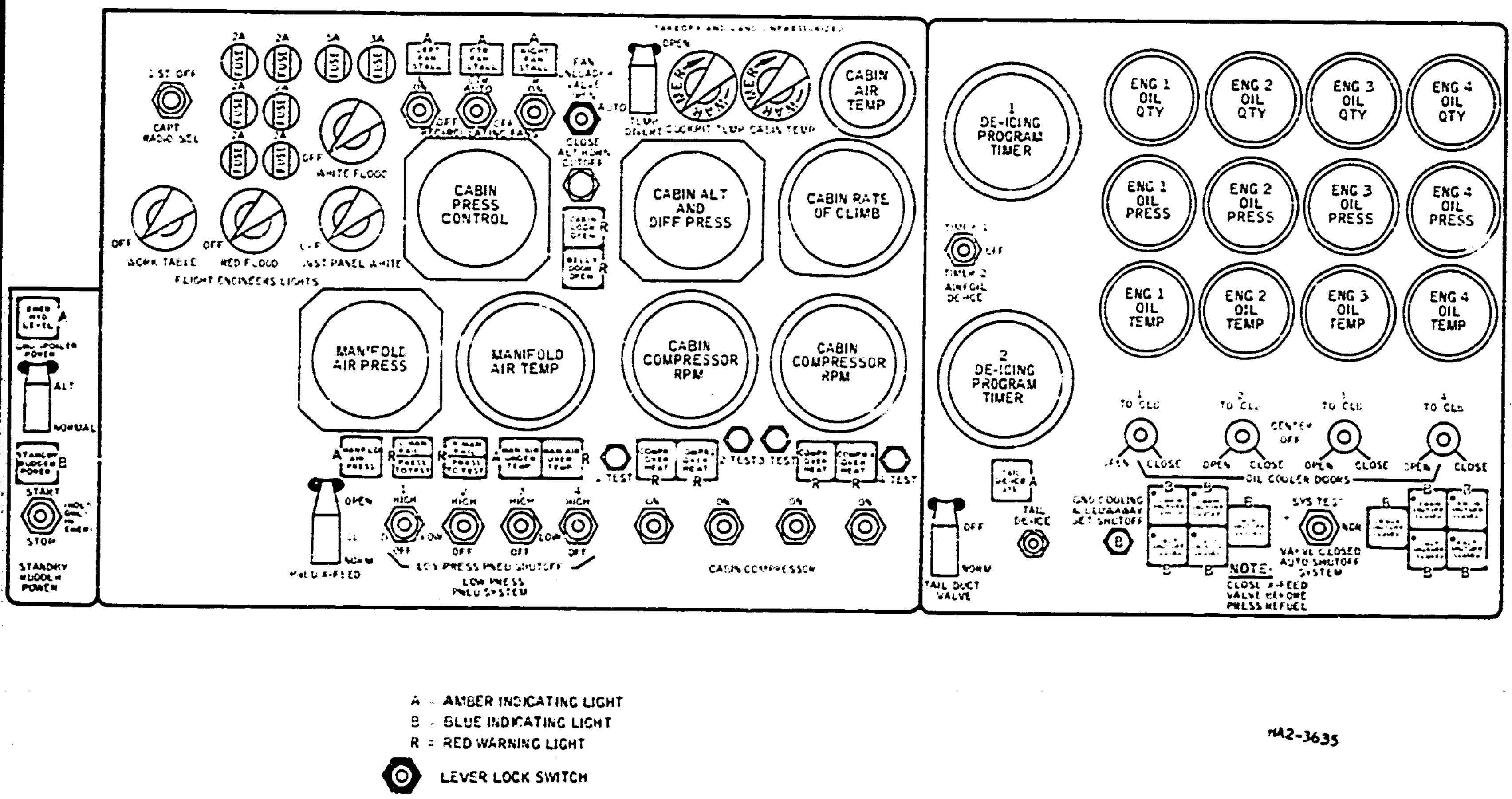
HA2-35898

Systems Engineer's Control Panel (Center Section)
Figure 1

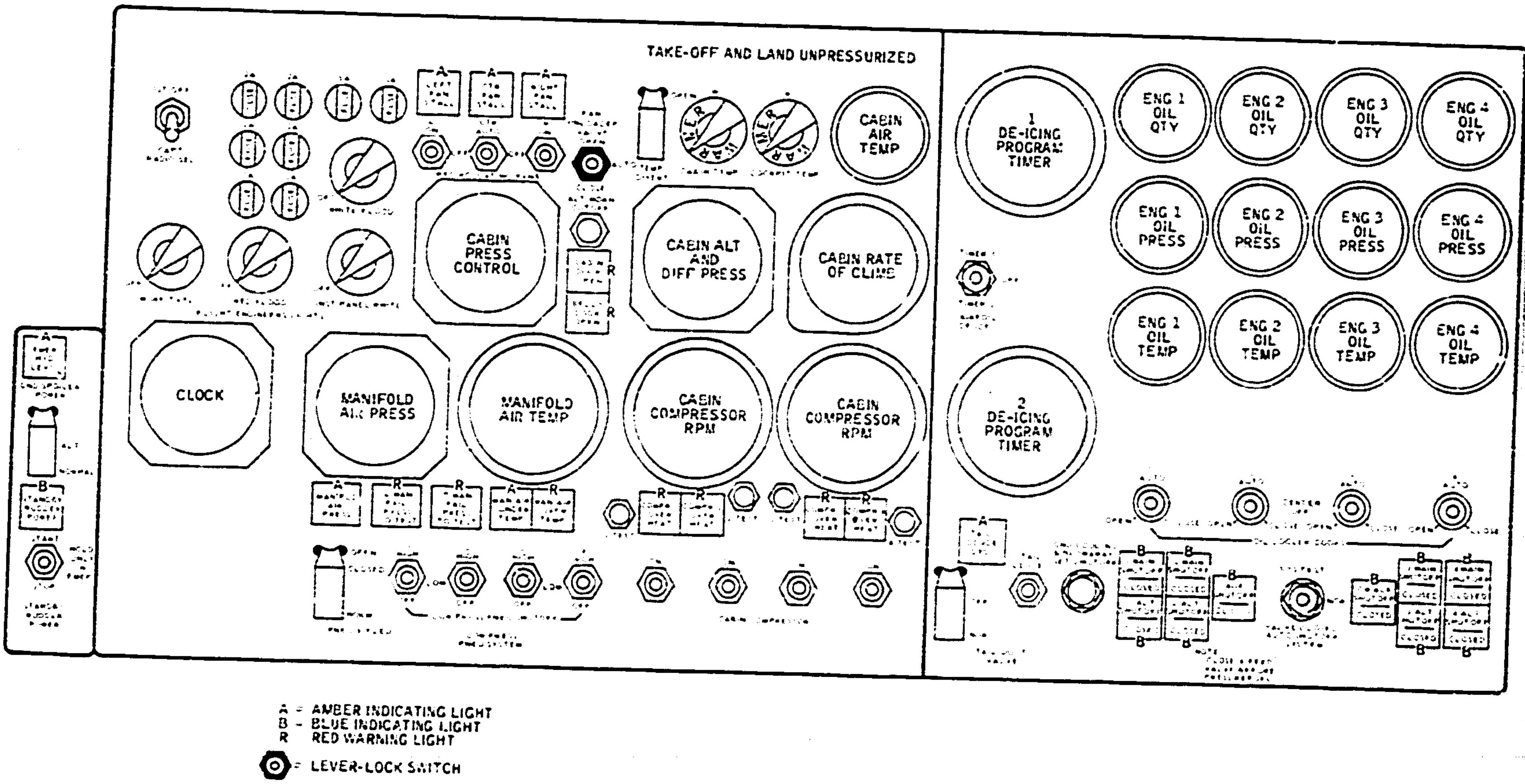


Systems Engineer's Control Panel (Center Section)
Figure 1

Printed in U.S.A.

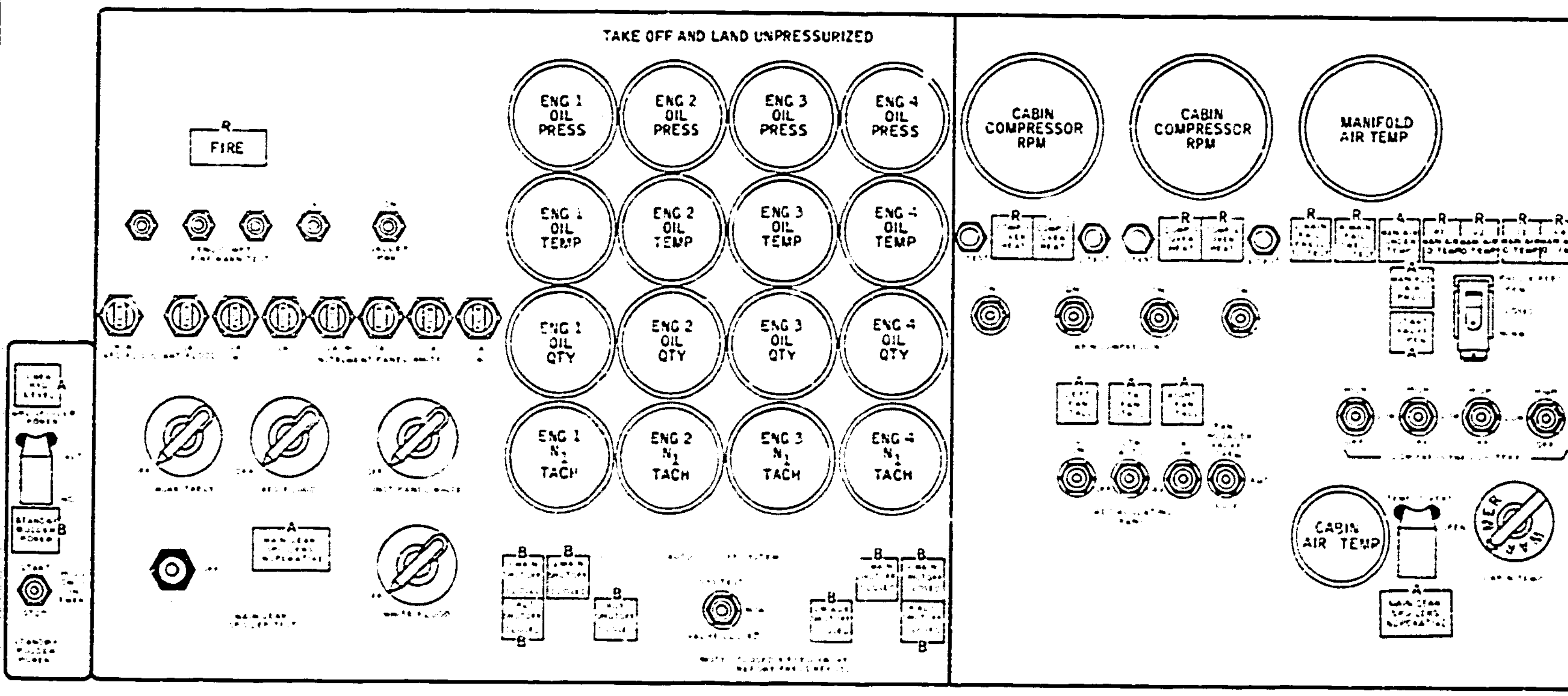


Systems Engineer's Control Panel (Upper Section)
Figure 1



HA2-3689A

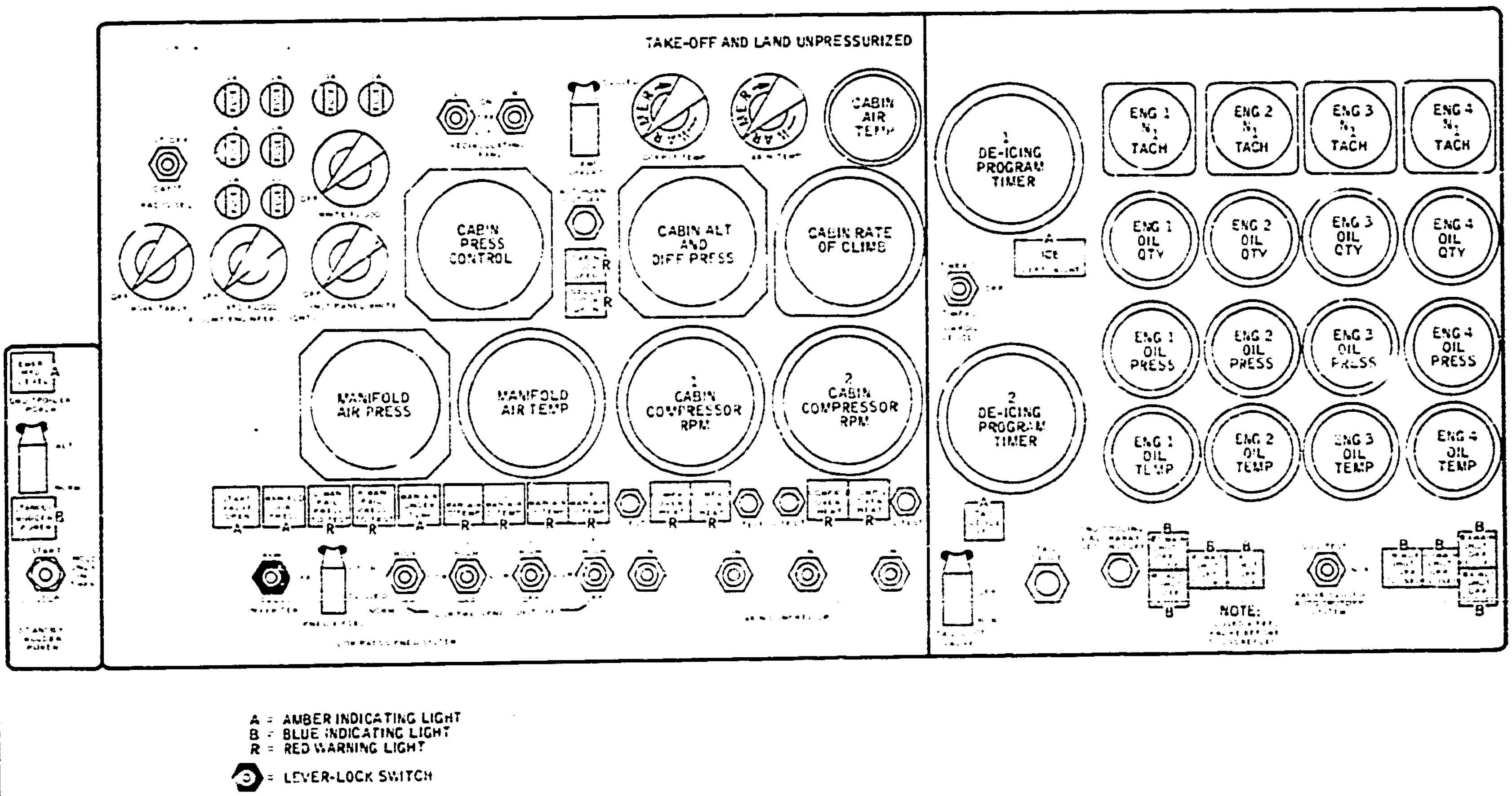
Systems Engineer's Control Panel (Center Section)
Figure 1



A - AMBER INDICATING LIGHT
B - BLUE INDICATING LIGHT
R - RED WARNING LIGHT
(symbol) - LEVER-LOCK SWITCH

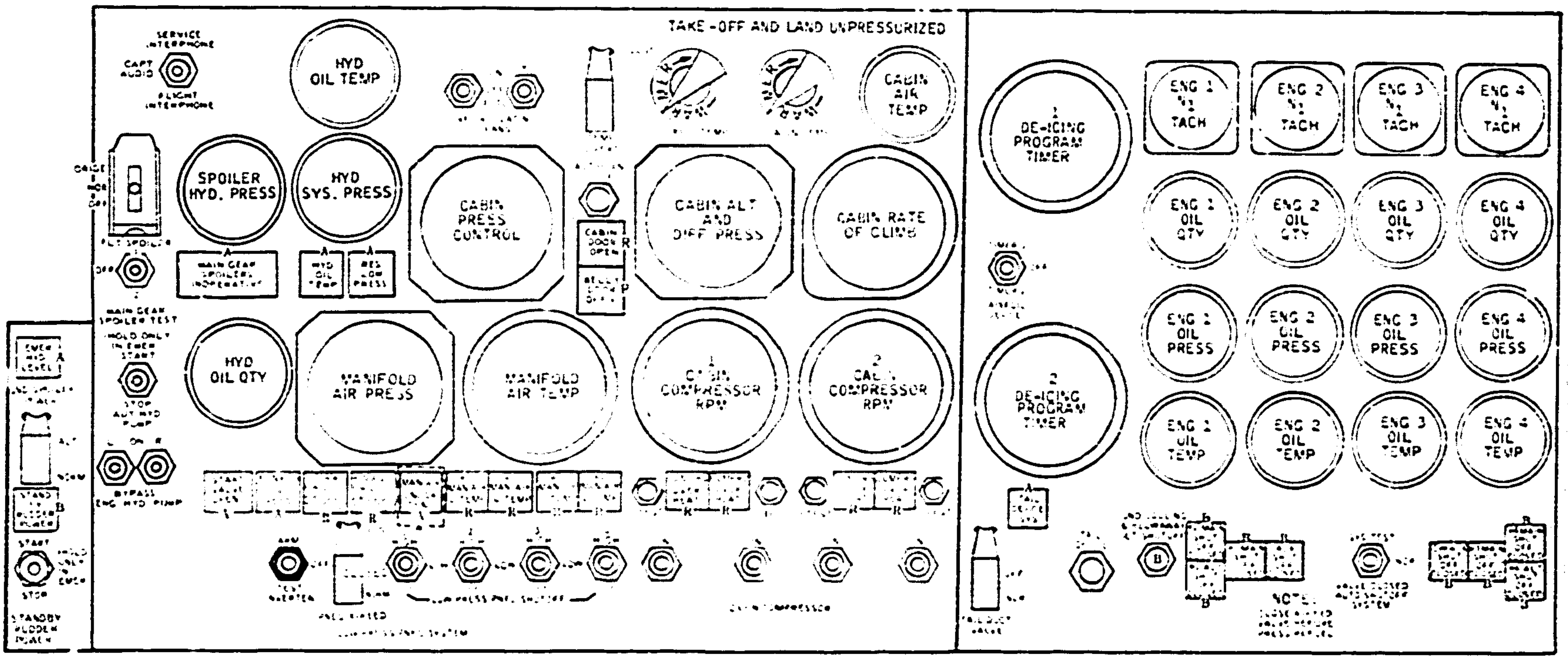
HA2-3723A

Systems Engineer's Control Panel (Center Section)
Figure 1



HA2-3758

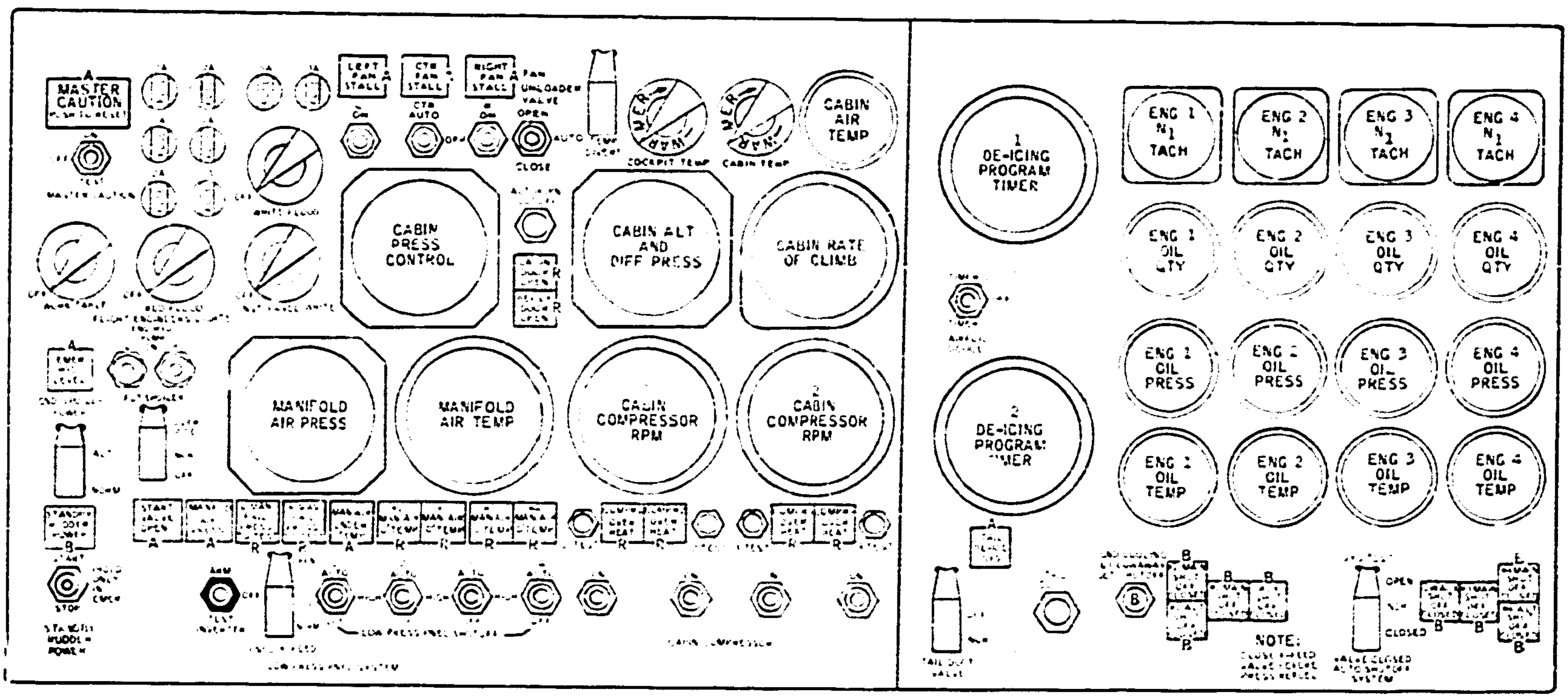
Systems Engineer's Control Panel (Center Section)
Figure 1



A AMBER INDICATING LIGHT
B BLUE INDICATING LIGHT
R RED WARNING LIGHT
= LEVER-LOCK SWITCH
• NOT INSTALLED ON JA8040

11A2-4219A

Systems Engineer's Control Panel (Center Section)
Figure 1

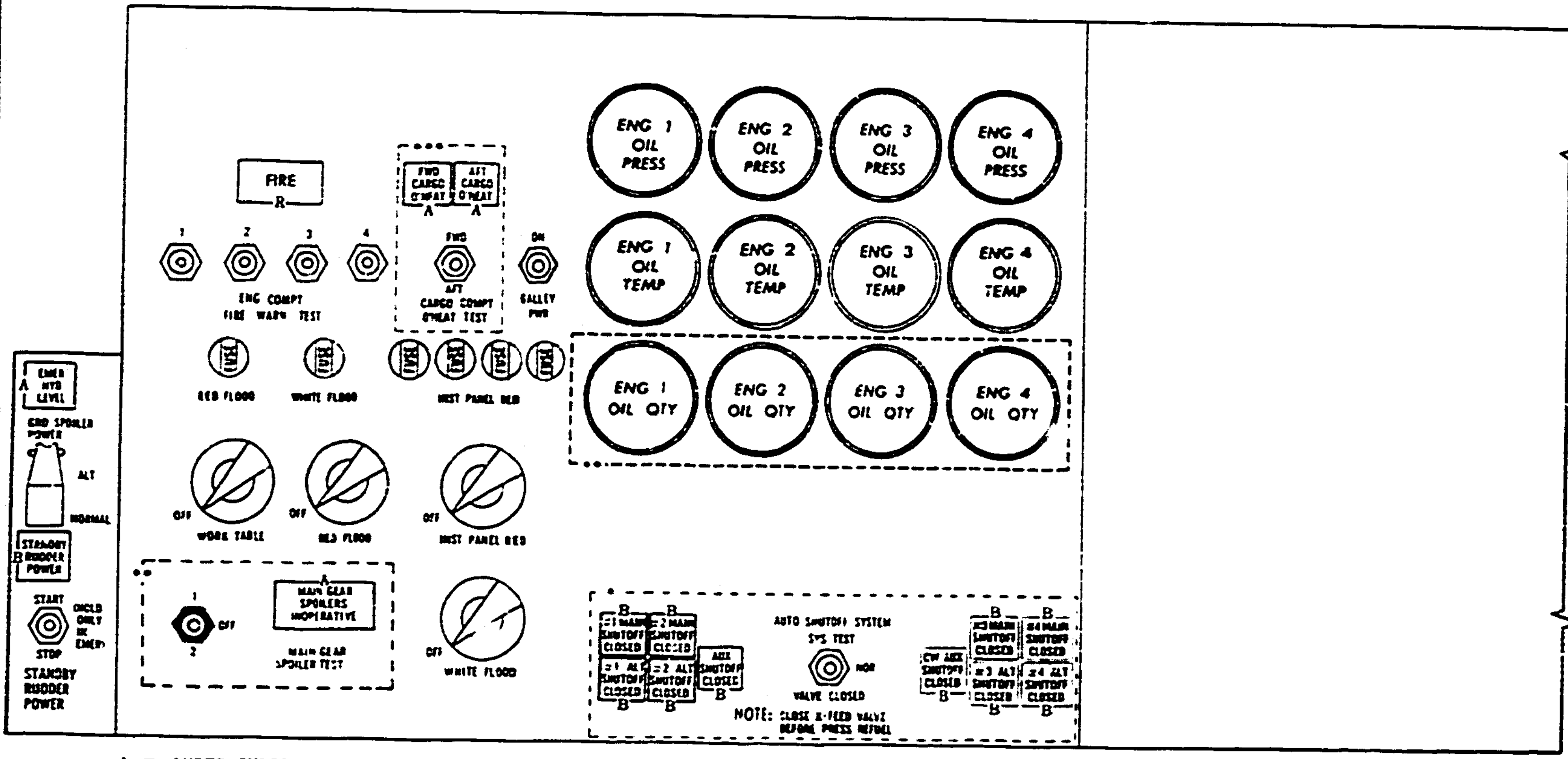


A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING
⊙ = LEVER-LOCK SWITCH

HA2-4461A

Systems Engineer's Control Panel (Center Section)
Figure 1

Printed in U.S.A.



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT

⬡ = LEVER-LOCK SWITCH

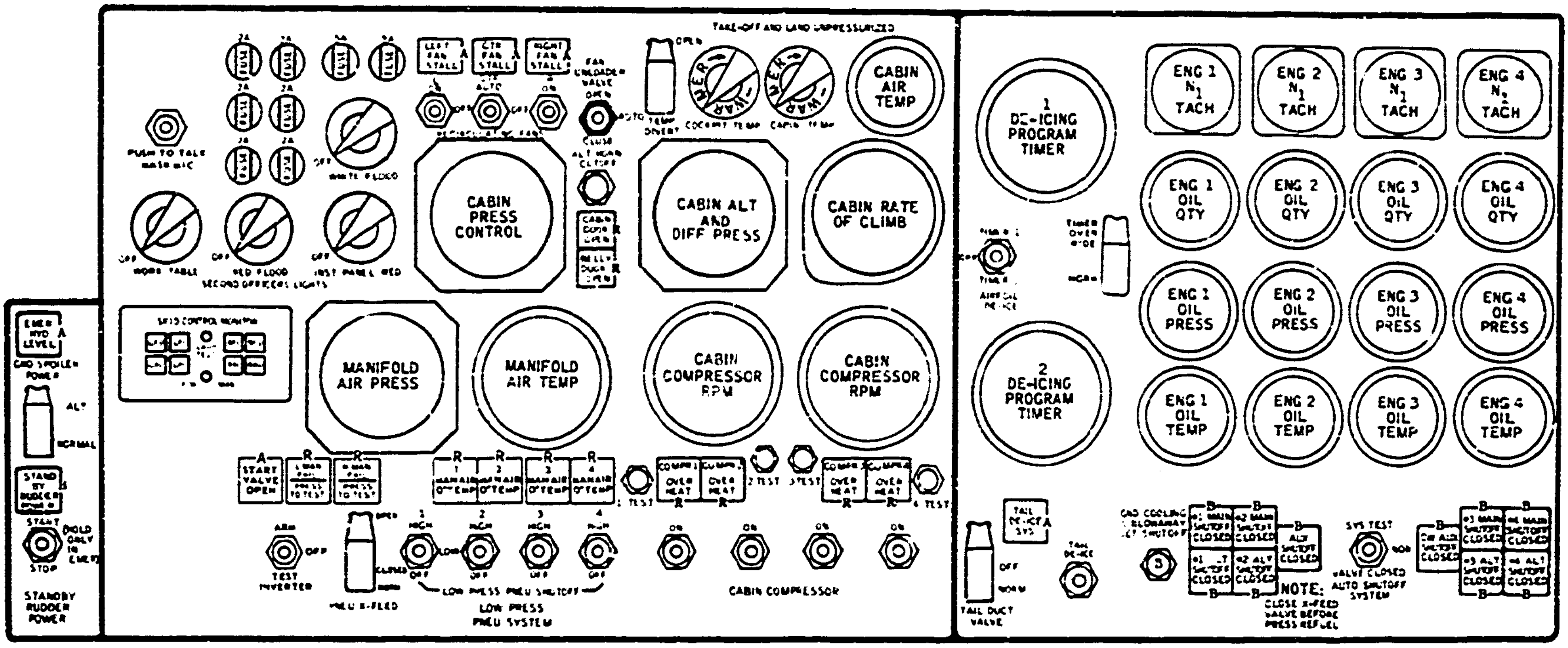
• = ON 801-804 AUTO SHUTOFF SYSTEM INSTALLED ON SYSTEMS ENGINEER'S PANEL (LOWER SECTION)

•• = NOT INSTALLED ON 801-811

••• = INSTALLED ON 801-815

H1-185D

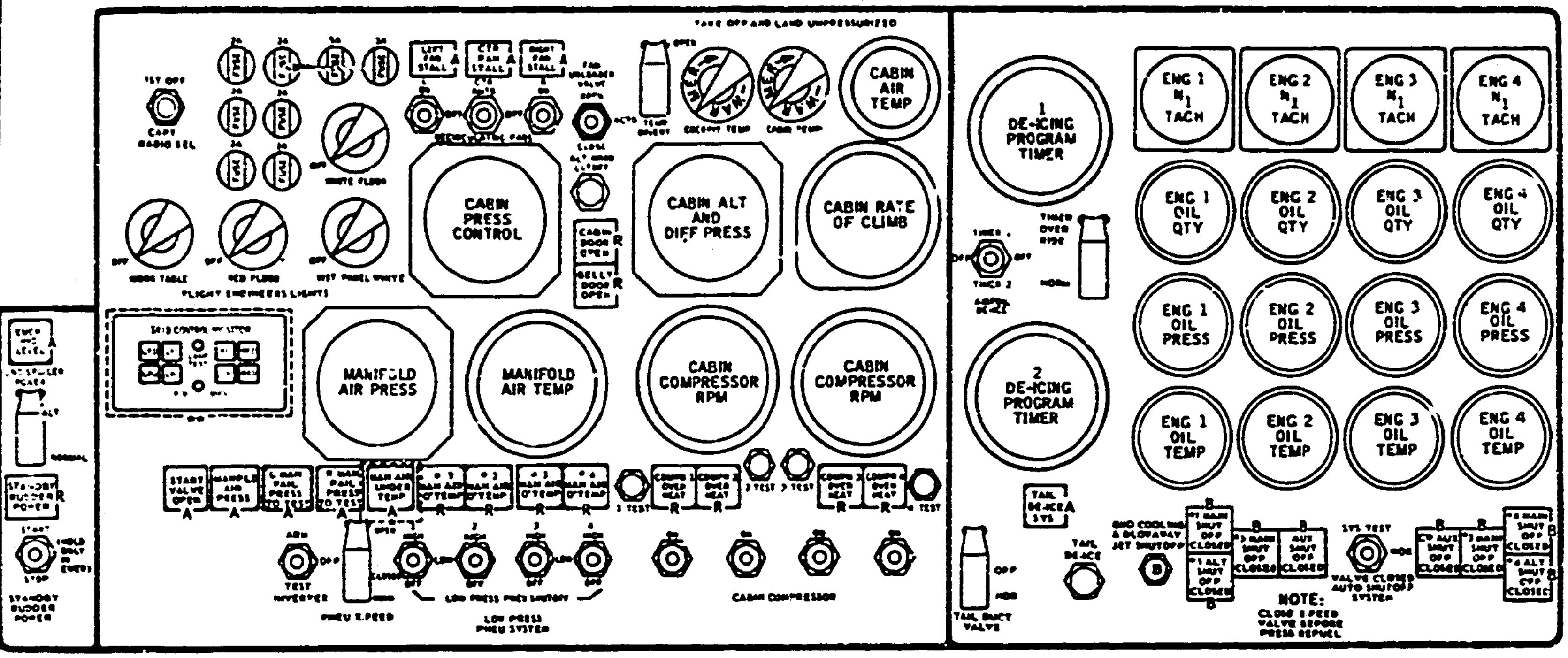
Systems Engineer's Control Panel (Center Section)
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
(symbol) = LEVER-LOCK SWITCH

HA2-4849D

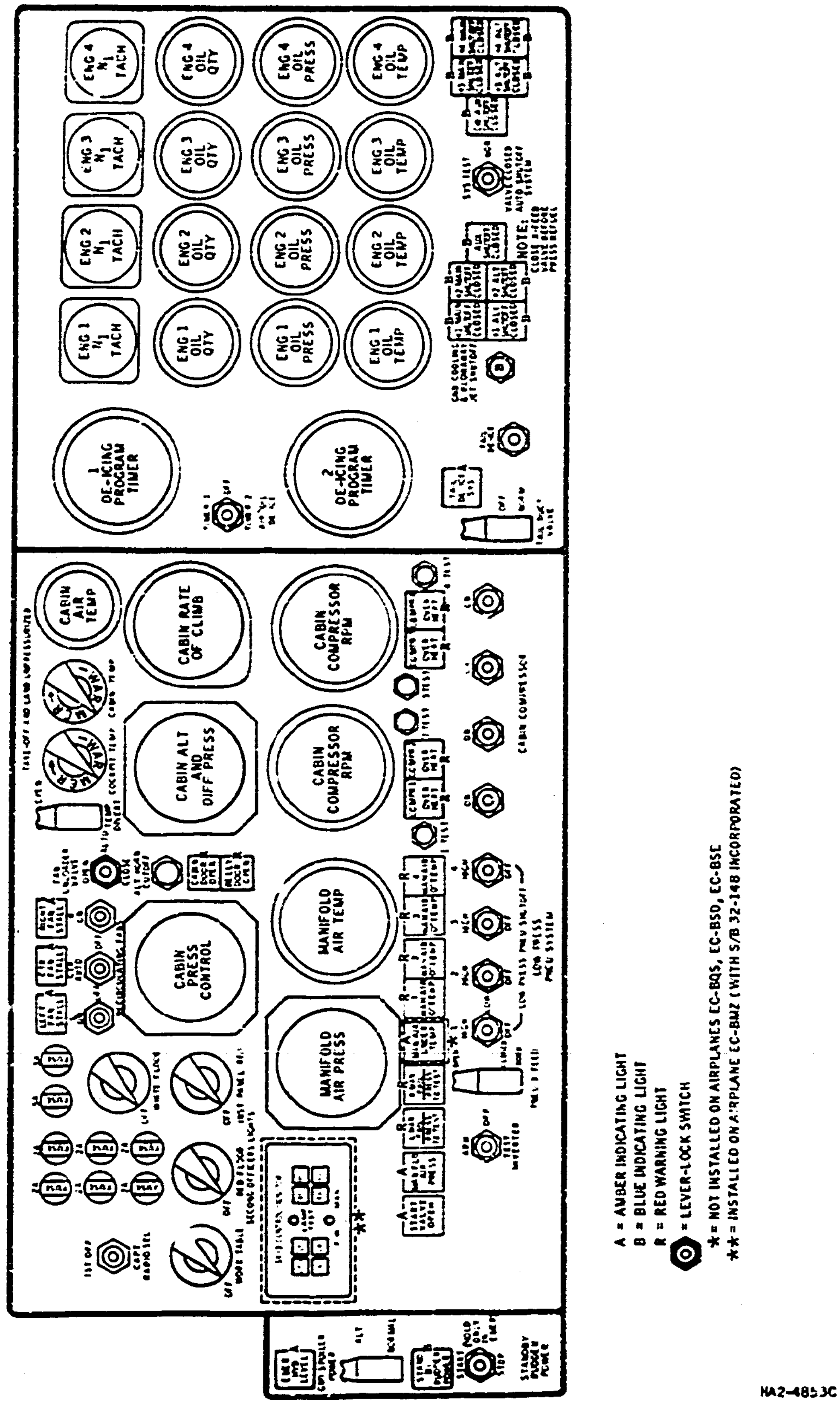
Systems Engineer's Control Panel (Center Section)
Figure 1



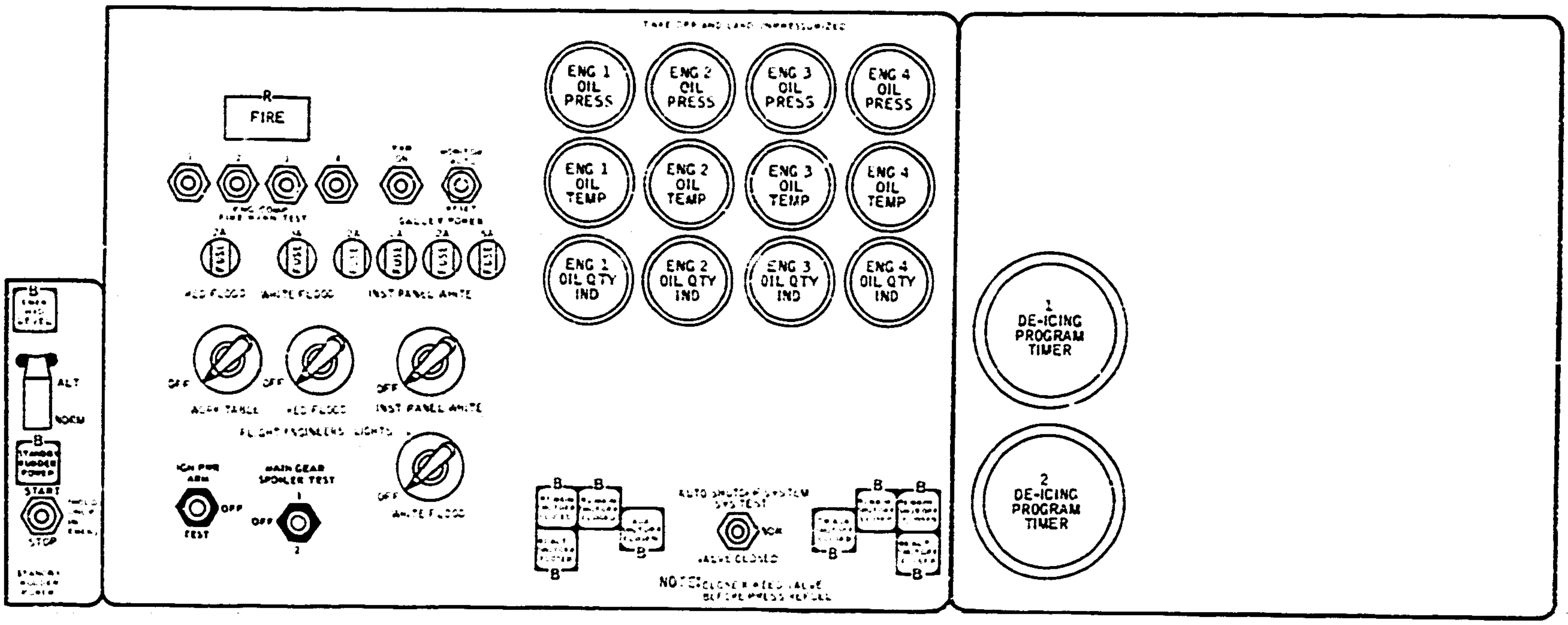
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
= LEVER-LOCK SWITCH
*INSTALLED ON N8631-N8638 WITHOUT S/B 36-38 INCORPORATED
** INSTALLED ON ALL AIRPLANES WITH S/B 32-148 INCORPORATED

HA2-4854C

Systems Engineer's Control Panel (Center Section)
Figure 1



Systems Engineer's Control Panel (Center Section)
Figure 1

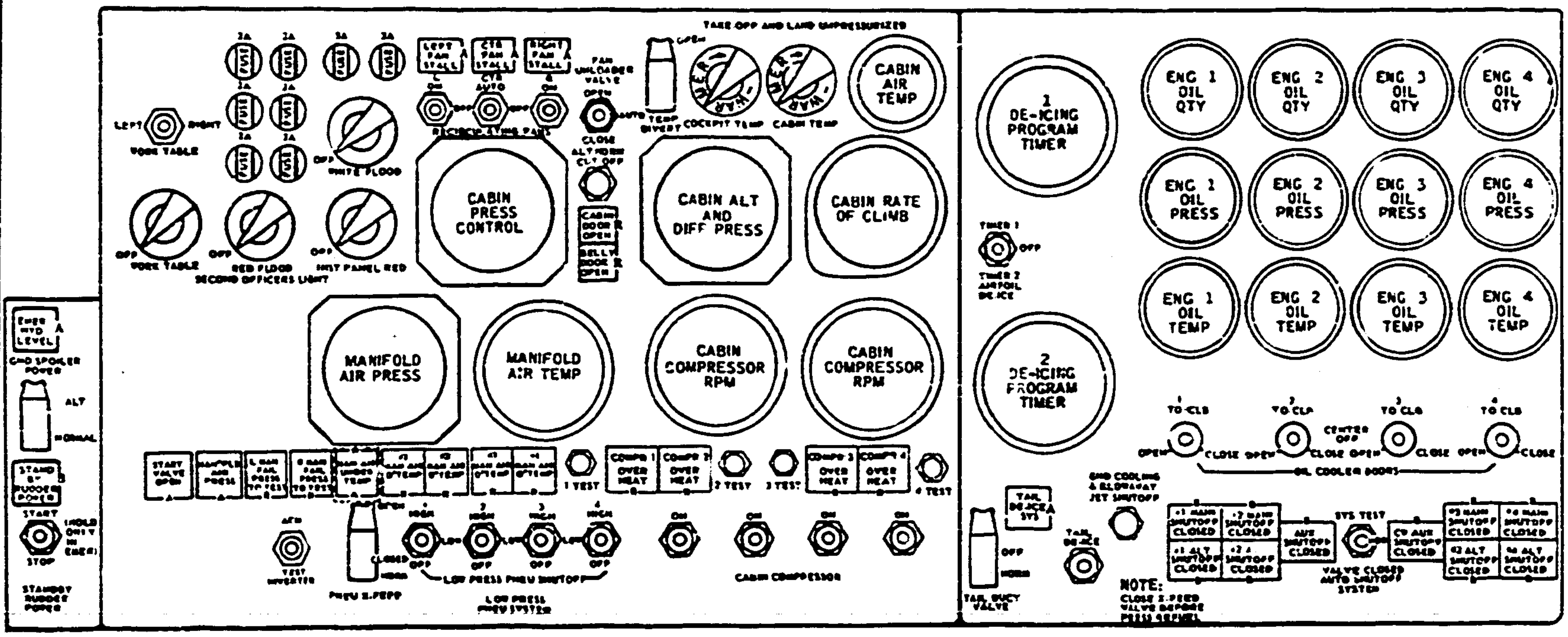


R - RED INDICATING LIGHT
B - BLUE INDICATING LIGHT
LEVER LOCK SWITCH

MA2-5479

Systems Engineer's Control Panel (Center Section)
Figure 1

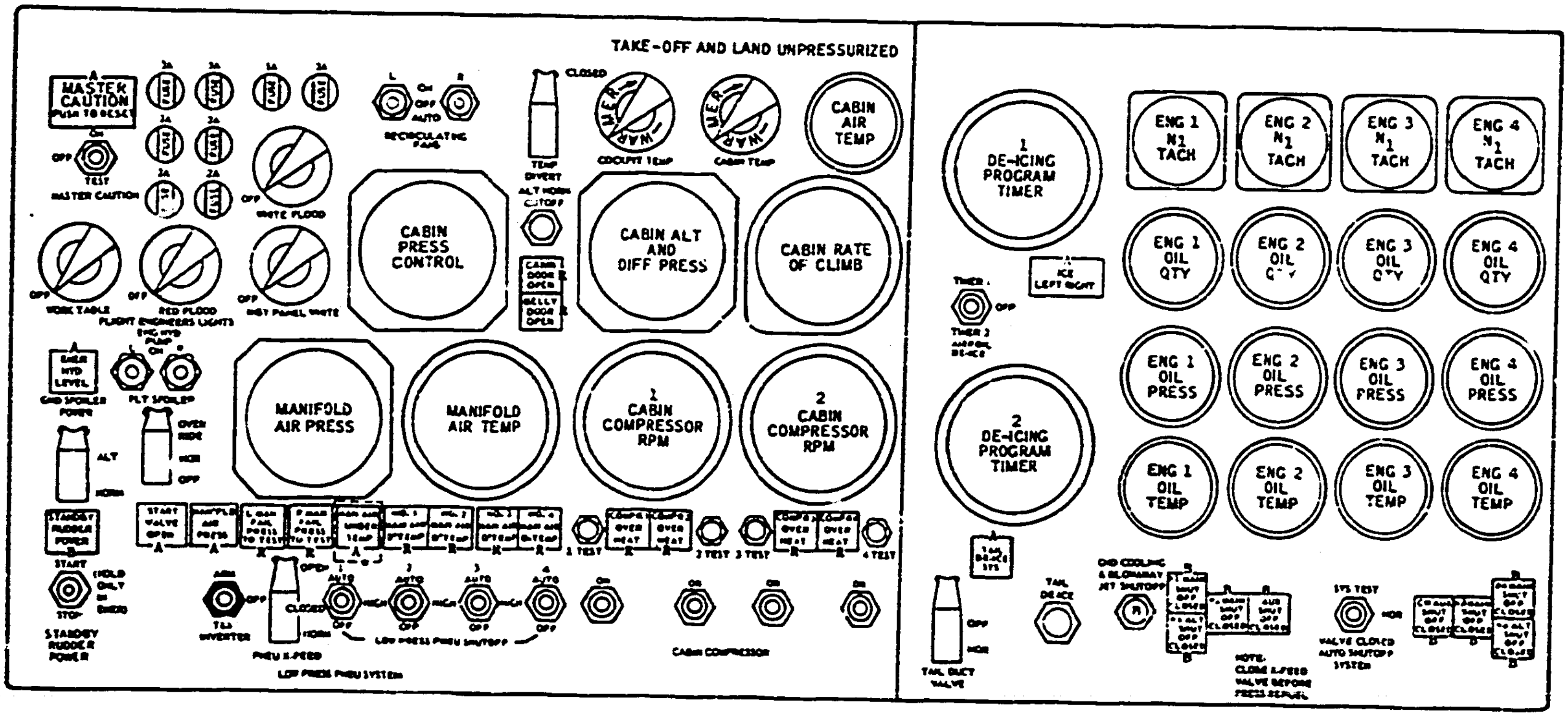
Printed in U.S.A.



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
= LEVER-LOCK SWITCH
* NOT INSTALLED ON AIRPLANE N8755-N8758, N8760 and N8759 WITH S/B36-38 INCORPORATED

HA2-5607B

Systems Engineer's Control Panel
(Center Section)
Figure 1



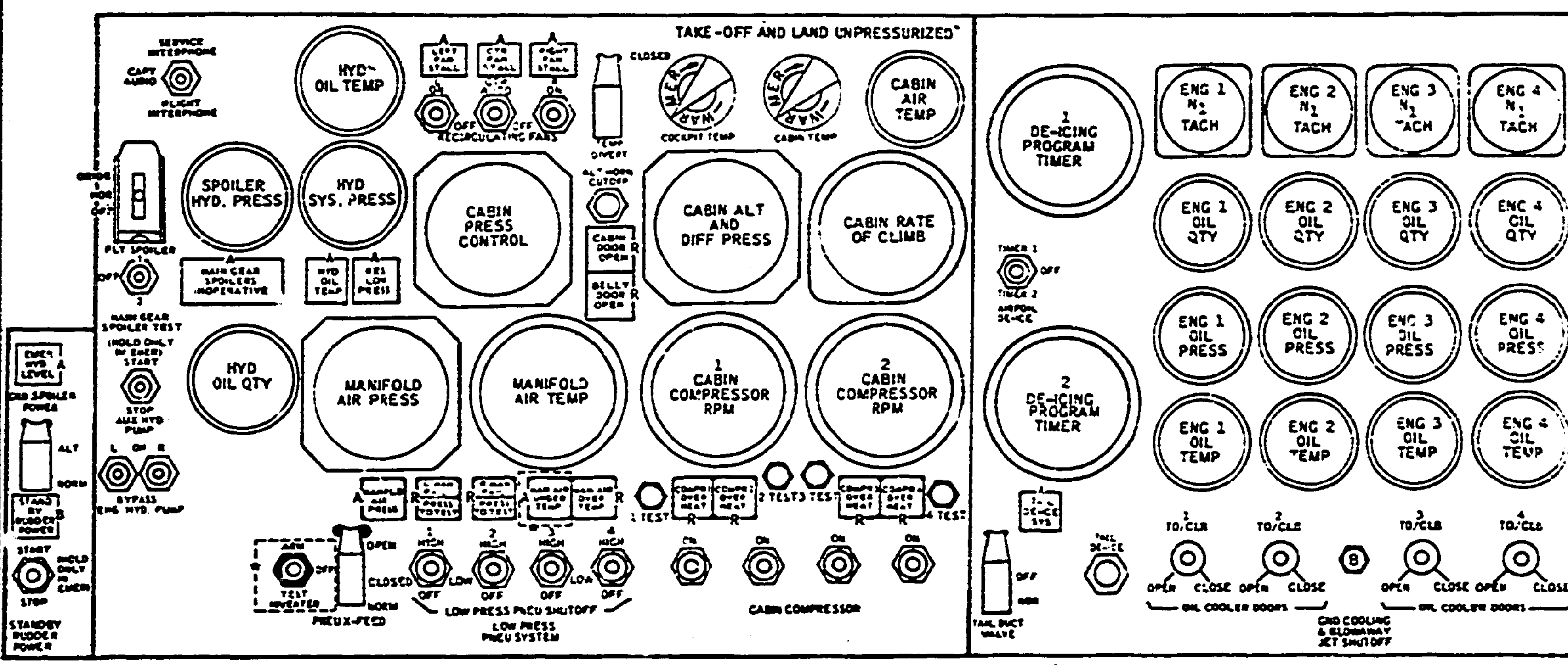
A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING

= LEVER-LOCK SWITCH

* INSTALLED ON OH-LFR, OH-LFS

HA2-5614A

Systems Engineer's Control Panel
(Center Section)
Figure 1

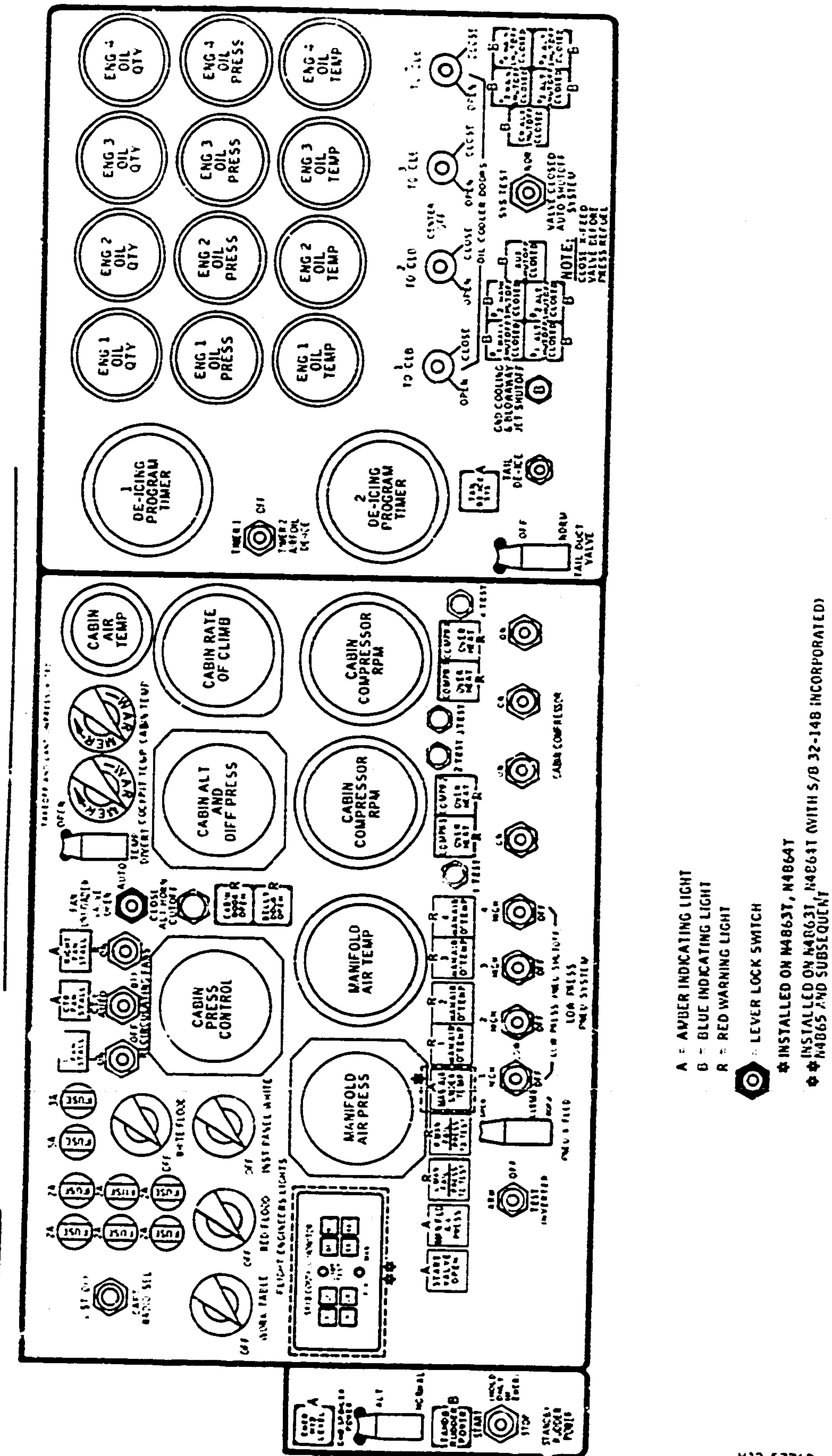


A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT

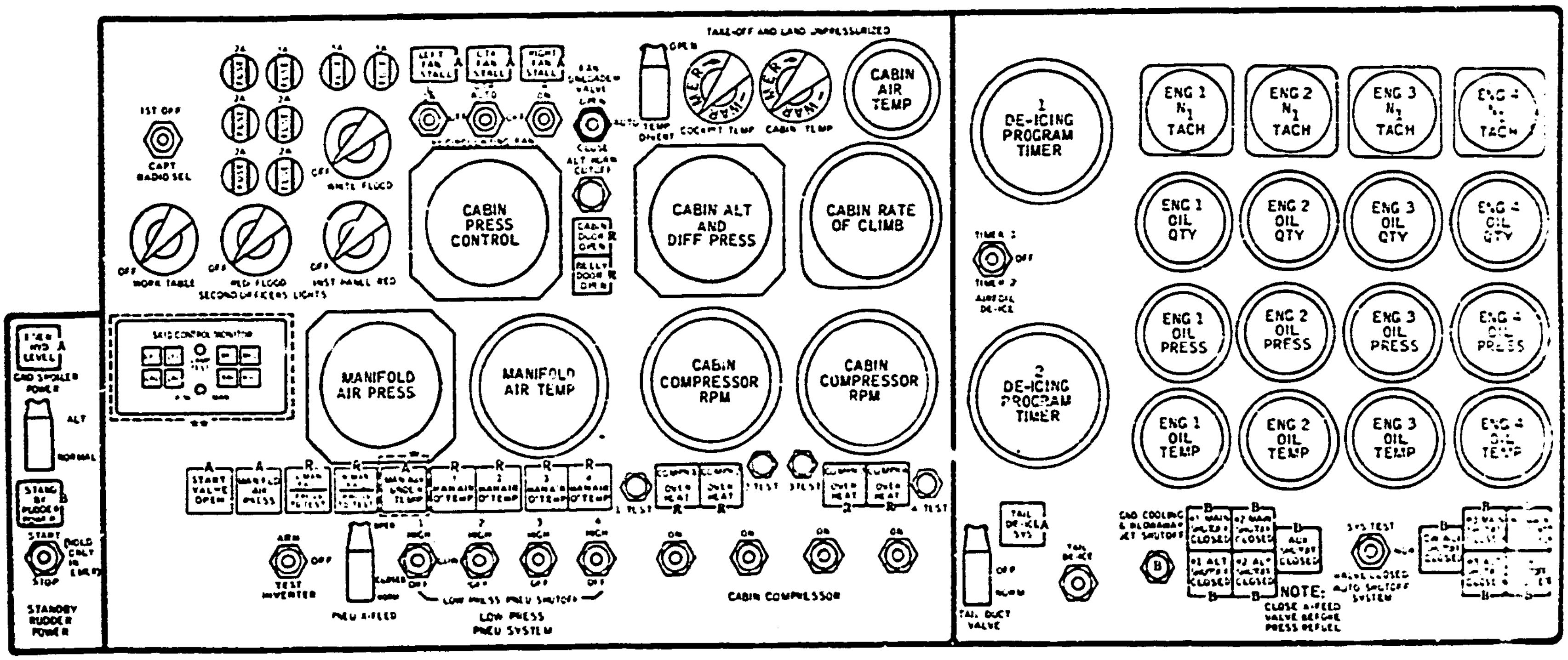
= LEVER-LOCK SWITCH

* INSTALLED ON JA8038, JA8039

Systems Engineer's Control Panel
(Center Section)
Figure 1



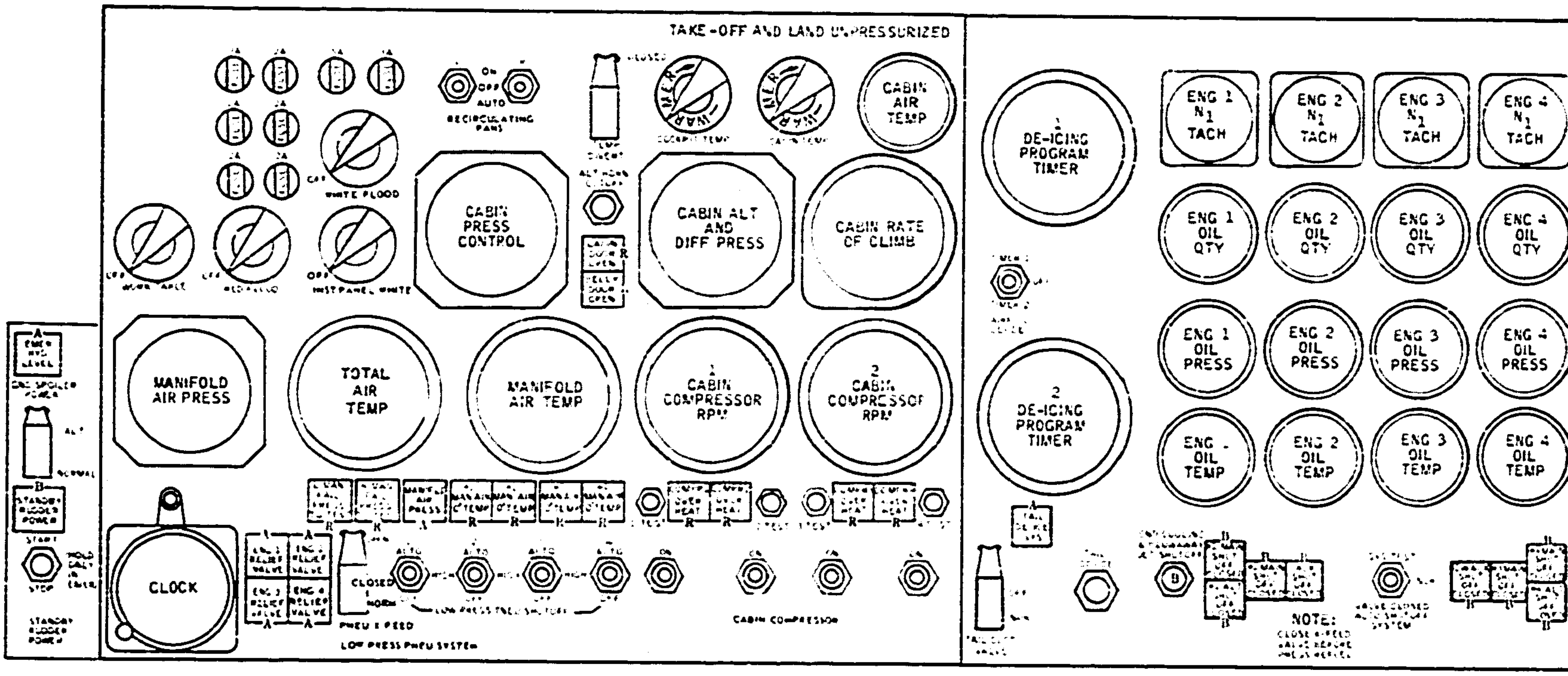
Systems Engineer's Control Panel
(Center Section)
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
(symbol) = LEVER-LOCK SWITCH
* NOT INSTALLED ON N865F AND SUBS
** INSTALLED ON 46112

HA2-6058A

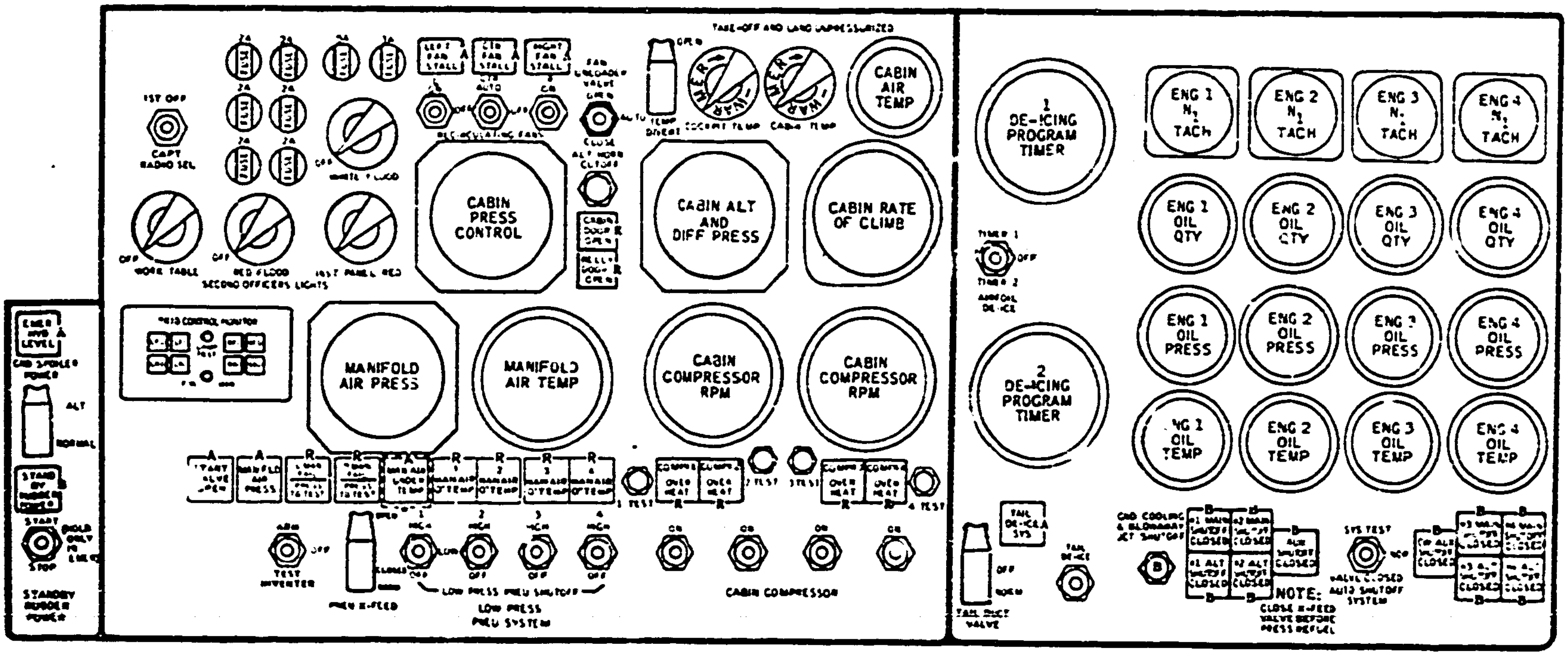
Systems Engineer's Control Panel (Center Section)
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING
(symbol) = LEVER-LOCK SWITCH

HA2-6054

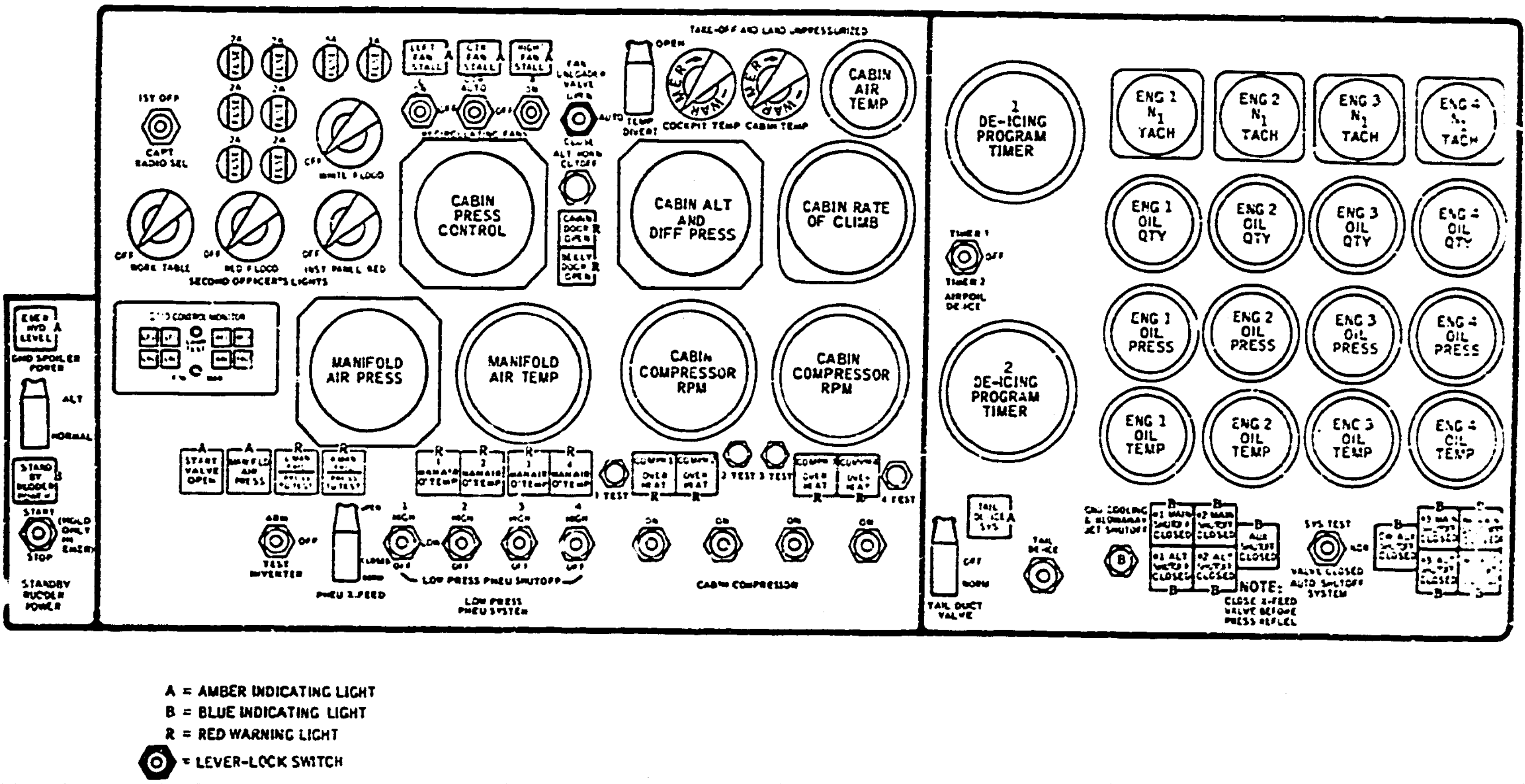
Systems Engineer's Control Panel
(Center Section)
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
= LEVER LOCK SWITCH
* = INSTALLED ON N4907C-N4908C

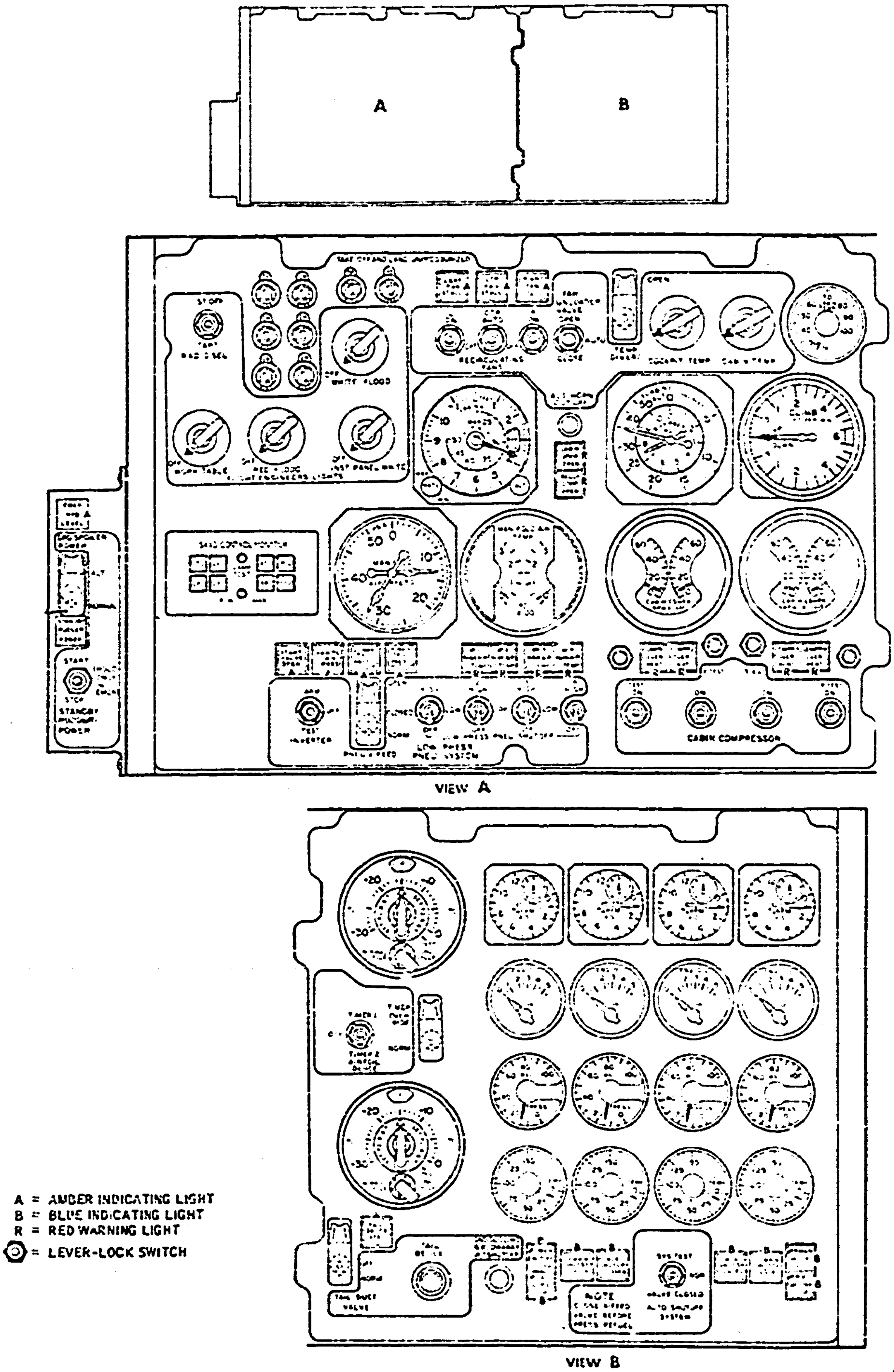
HA2-6429B

Systems Engineer's Control Panel (Center Section)
Figure 1



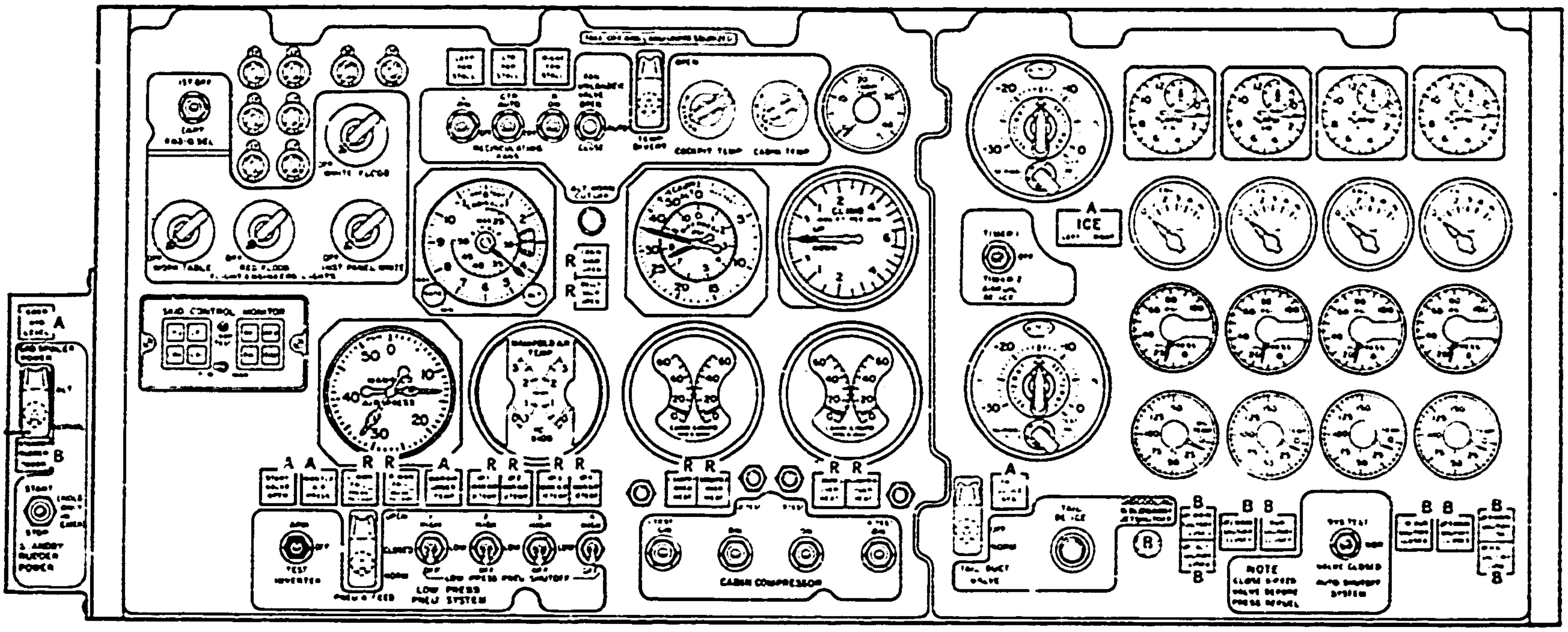
HA2-6462A

Systems Engineer's Control Panel (Center Section)
Figure 1



Systems Engineer's Control Panel (Center Section)
Figure 1

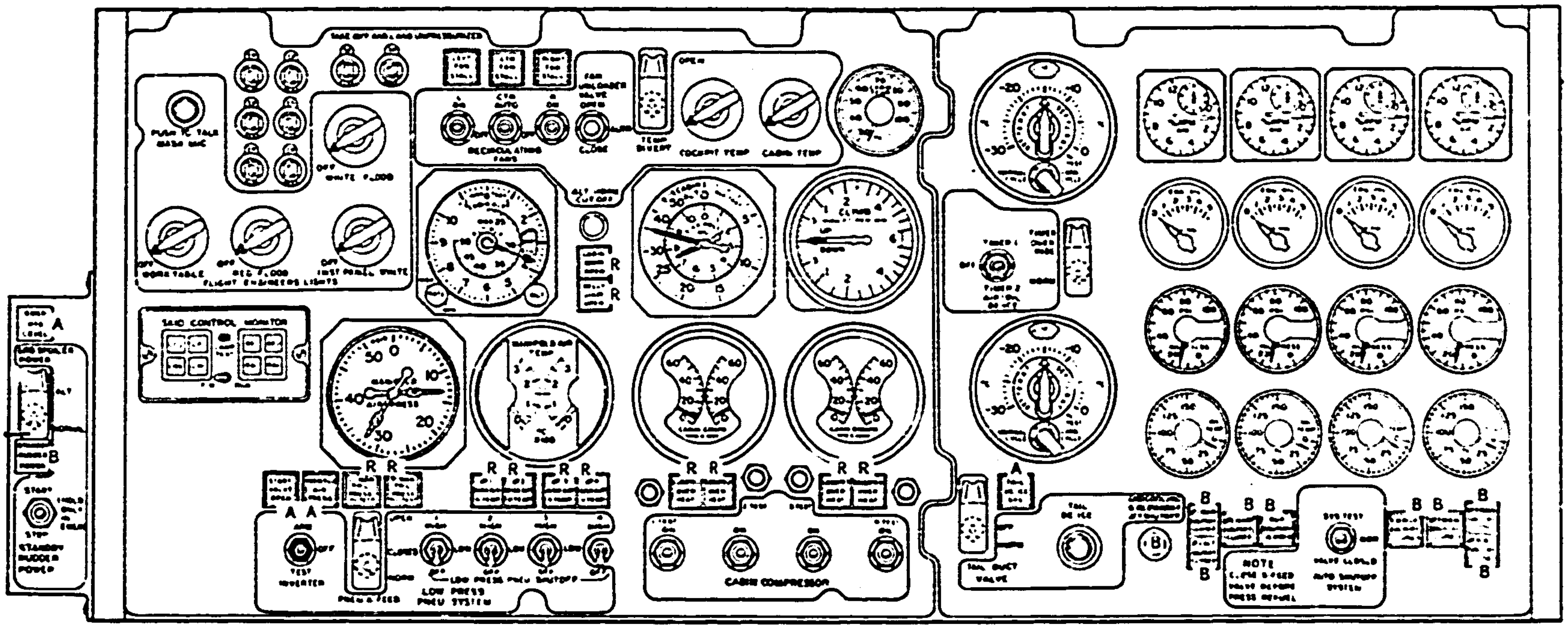
Printed in U.S.A.



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
⊚ = LOCK-LEVER SWITCH

HA2-7188

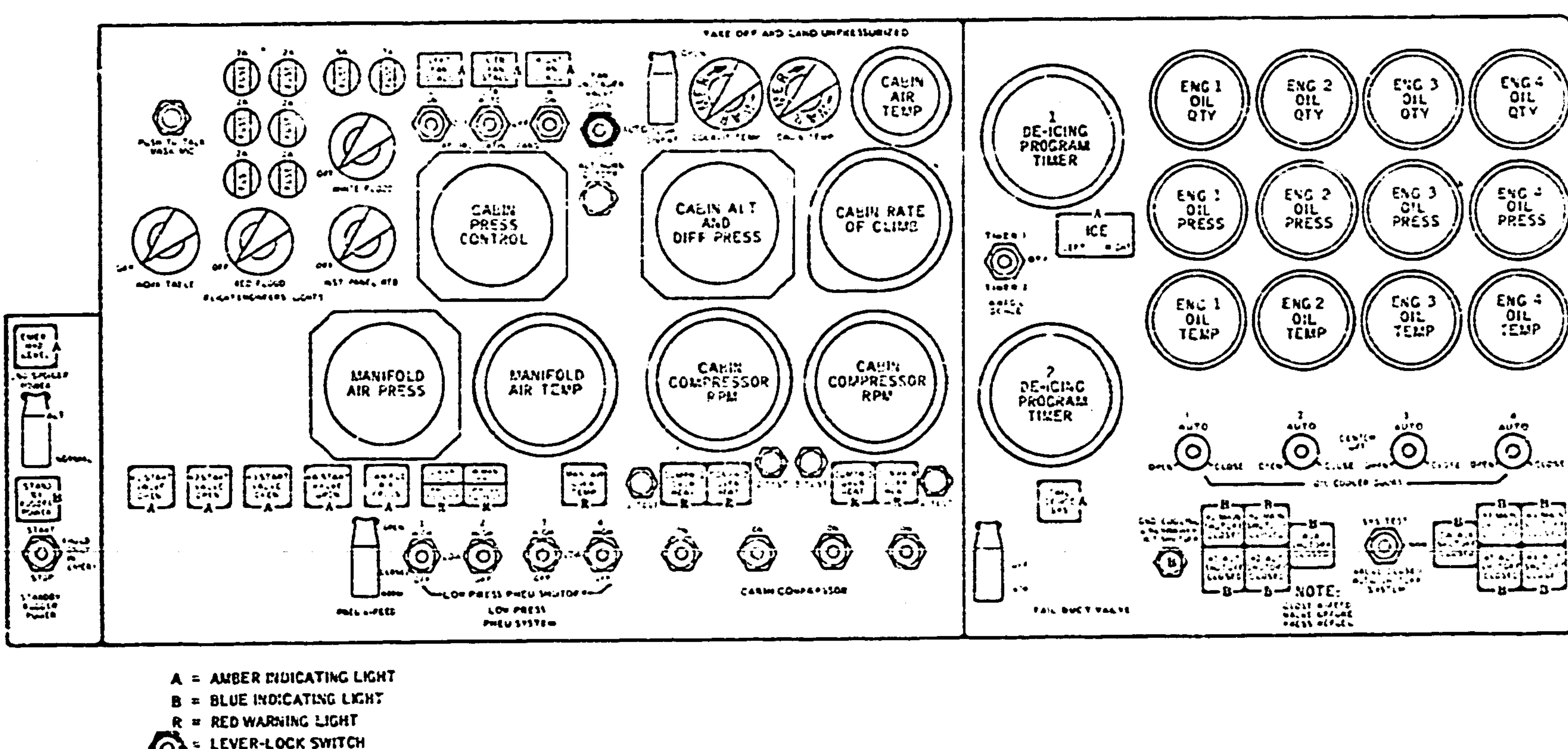
Systems Engineer's Control Panel (Center Section)
Figure 1



A = AMBER INDICATING LIGHT
B = BLUE INDICATING LIGHT
R = RED WARNING LIGHT
◎ = LOCK-LEVER SWITCH

HA2-7203

Systems Engineer's Control Panel (Center Section)
Figure 1



HA2-7506

Systems Engineer's Control Panel
(Center Section)
Figure 1

SYSTEMS ENGINEER'S CONTROL PANEL (CENTER SECTION) - MAINTENANCE PRACTICES

1. General

   A. In order to remove the systems engineer's control panel (center section), it is necessary to remove all power from the airplane and to disconnect all electrical connectors from the instruments. The electrical leads from the smaller components mounted on the right panel are ganged into multiple-contact plugs mounted on a rack firmly fixed to the panel and designed to mate with spring-loaded, structure-mounted receptacles. The panel is subjected to heavy pressure, which must be relieved evenly when the panel is removed, allowing it to eject straight out, avoiding damage to the panel and electrical connectors.

   B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Systems Engineer's Panel (Center Section)

   A. Remove Left Panel.

      (1) Remove power from airplane.

      WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

      (2) Inspect instruments for proper secured mounting.

      (3) Release quick-release fasteners around perimeter of panel.

      (4) Lift panel out a few inches and disconnect lines and electrical connectors.

      (5) Carefully lower panel and remove from cavity.

      (6) Tag and cap all lines, ports, and electrical connectors.

   B. Install Left Panel.

      (1) Verify power is removed from airplane.

      (2) Check that all instruments are securely clamped in panel.

      (3) Remove all caps from lines, ports, and electrical connectors.

      (4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Position panel in cavity and secure with quick-release fasteners.

(6) Perform operational test of all systems involved to determine integrity of new installation.

C. Remove Right Panel.

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

NOTE: Engine oil temperature, engine oil pressure, engine oil quanity, and tachometer indicators are rack-and-panel mounted.

(2) Restrain each rack-and-panel mounted instrument by hand pressure around bezel, loosen mounting clamp adjustment screw, and allow instrument to eject slowly until spring pressure is relieved.

(3) Pull instruments clear of connector (about halfway out of cutout) and tighten mounting clamp adjustment screw.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING REMOVAL OPERATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(4) Inspect instruments for properly secured mounting.

(5) Restrain panel and remove attaching screws around perimeter. Carefully allow panel to eject until spring pressure is relieved.

(6) Lift panel out a few inches, and disconnect lines and electrical connectors.

(7) Carefully lower panel and remove from cavity.

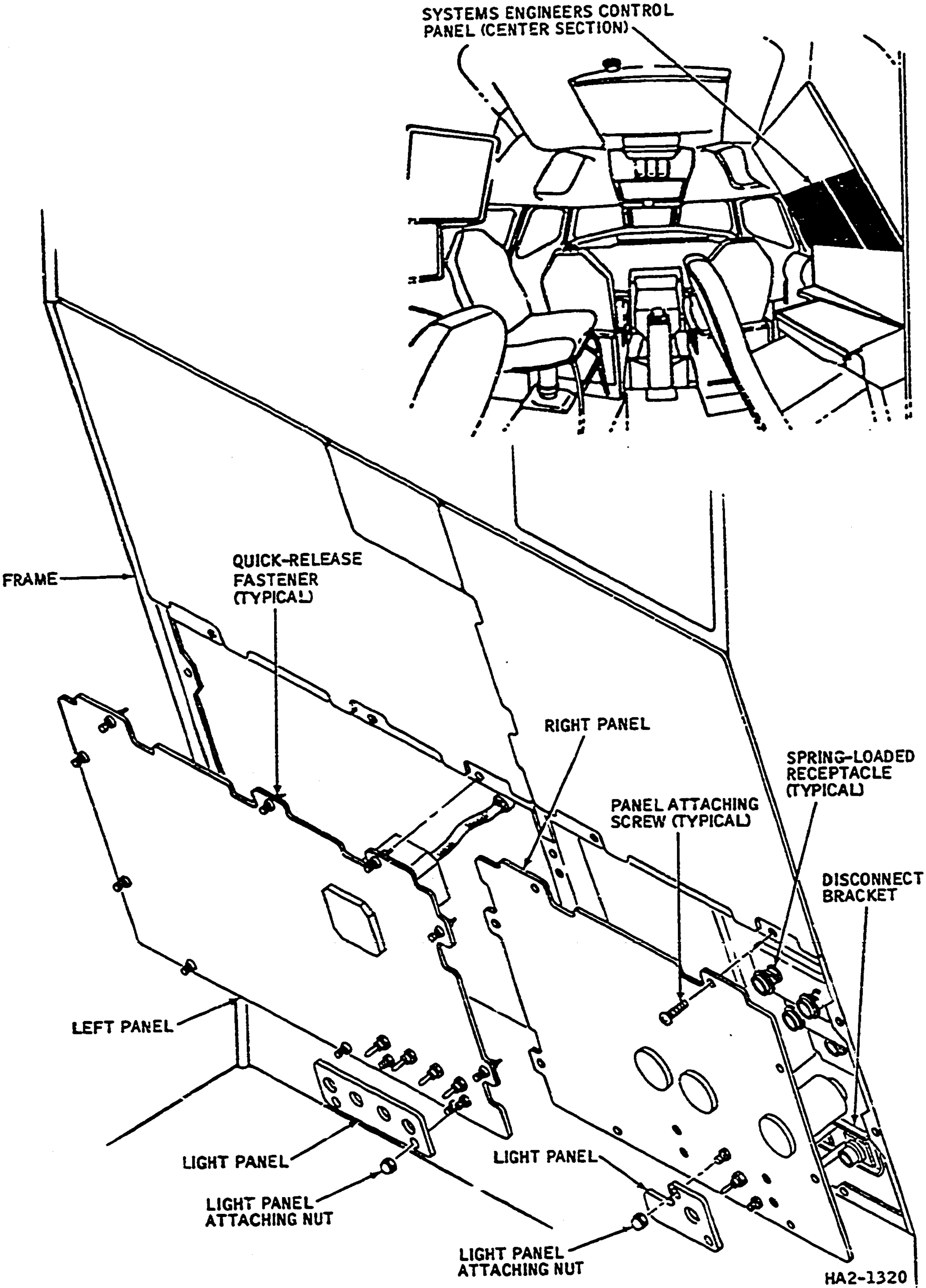
(8) Tag and cap all lines, ports, and electrical connectors.

D. Install Right Panel.

(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

NOTE: Rack-and-panel mounted instruments should be clamped in extended position.



Systems Engineer's Control Panel
(Center Section) Replacement
Figure 201

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Carefully position panel in cavity and apply pressure evenly to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure panel with attaching screws.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING INSTALLATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(7) Loosen clamp adjustment screws on rack-and-panel mounted instruments into cavities.

(8) Tighten mounting clamps.

(9) Perform operational test of all systems involved to determine integrity of new installation.

SYSTEMS ENGINEER'S CONTROL PANEL (CENTER SECTION) - MAINTENANCE PRACTICES

1. General

   A. In order to remove the systems engineer's control panel (center section), it is necessary to remove all power from the airplane and to disconnect all electrical connectors from the instruments. The electrical leads from the smaller components mounted on the right panel are ganged into multiple-contact plugs mounted on a rack firmly fixed to the panel and designed to mate with spring-loaded, structure-mounted receptacles. The panel is subjected to heavy pressure, which must be relieved evenly when the panel is removed, allowing it to eject straight out, avoiding damage to the panel and electrical connectors.

   B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Systems Engineer's Panel (Center Section)

   A. Remove Left Panel.

      (1) Remove power from airplane.

      WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

      (2) Inspect instruments for properly secured mounting.

      (3) Release quick-release fasteners around perimeter of panel.

      (4) Lift panel out a few inches, and disconnect lines and electrical connectors.

      (5) Carefully lower panel and remove from cavity.

      (6) Tag and cap all lines, ports, and electrical connectors.

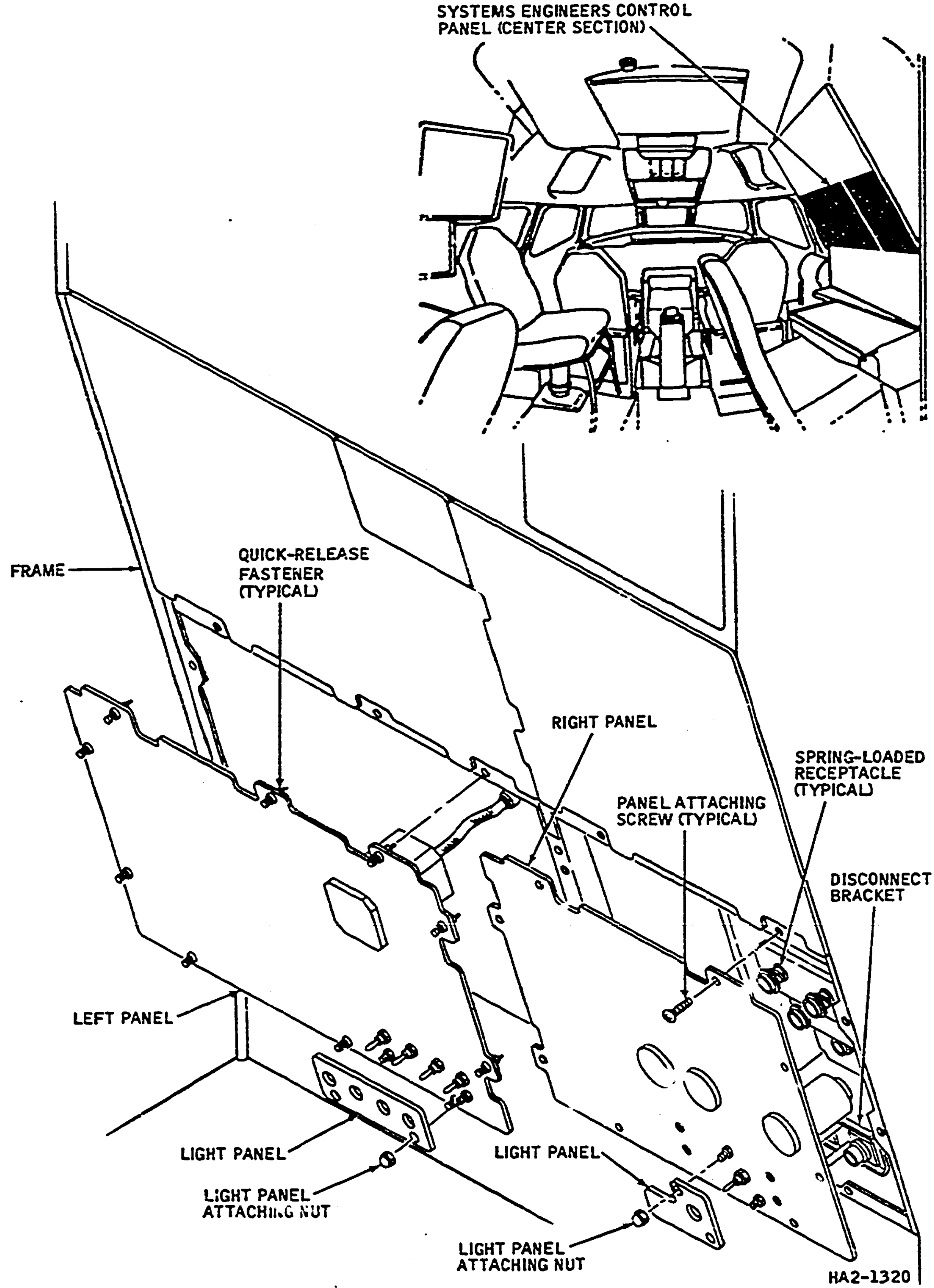
   B. Install Left Panel.

      (1) Verify power is removed from airplane.

      (2) Check that all instruments are securely clamped in panel.

      (3) Remove all caps from lines, ports, and electrical connectors.

      (4) Position panel a few inches from cavity and connect all lines and electrical connectors.



Systems Engineer's Control Panel
(Center Section) Replacement
Figure 201

(5) Position panel in cavity and secure with quick-release fasteners.

(6) Perform operational test of all systems involved to determine integrity of new installation.

C. Remove Right Panel.

(1) Remove power from airplane.

<u>WARNING</u>: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

<u>NOTE</u>: Engine oil temperature, engine oil pressure, and tachometer indicators are rack-and-panel mounted.

(2) Restrain each rack-and-panel mounted instrument by hand pressure around bezel, loosen mounting clamp adjustment screw, and allow instrument to eject slowly until spring pressure is relieved.

(3) Pull instruments clear of connector (about halfway out of cutout) and tighten mounting clamp adjustment screw.

<u>CAUTION</u>: AVOID ROTATION OF INSTRUMENTS DURING REMOVAL OPERATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(4) Inspect instruments for properly secured mounting.

(5) Restrain panel and remove attaching screws around perimeter. Carefully allow panel to eject until spring pressure is relieved.

(6) Lift panel out a few inches, and disconnect lines and electrical connectors.

(7) Carefully lower panel and remove from cavity.

(8) Tag and cap all lines, ports, and electrical connectors.

D. Install Right Panel.

(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

<u>NOTE</u>: Rack-and-panel mounted instruments should be clamped in extended position.

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity and connect all lines and electrical connectors.

(5) Carefully position panel in cavity and apply pressure evenly to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure panel with attaching screws.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING INSTALLATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(7) Loosen clamp adjustment screws on rack-and-panel mounted instruments and press instruments into cavities.

(8) Tighten mounting clamps.

(9) Perform operational test of all systems involved to determine integrity of new installation.

SYSTEMS ENGINEER'S CONTROL PANEL (CENTER SECTION) - MAINTENANCE PRACTICES

1. General

   A. In order to remove the systems engineer's control panel (center section), it is necessary to remove all power from the airplane and to disconnect all electrical connectors from the instruments. The electrical leads from the smaller components mounted on the right panel are ganged into multiple-contact plugs mounted on a rack firmly fixed to the panel and designed to mate with spring-loaded, structure-mounted receptacles. The panel is subjected to heavy pressure, which must be relieved evenly when the panel is removed, allowing it to eject straight out, avoiding damage to the panel and electrical connectors.

   B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Systems Engineer's Panel (Center Section)

   A. Remove Left Panel.

      (1) Remove power from airplane.

         WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

      (2) Inspect instruments for properly secured mounting.

      (3) Release quick-release fasteners around perimeter of panel.

      (4) Lift panel out a few inches and disconnect lines and electrical connectors.

      (5) Carefully lower panel and remove from cavity.

      (6) Tag and cap all lines, ports, and electrical connectors.

   B. Install Left Panel.

      (1) Verify power is removed from airplane.

      (2) Check that all instruments are securely clamped in panel.

      (3) Remove all caps from lines, ports, and electrical connectors.

      (4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Position panel in cavity and secure with quick-release fasteners.

(6) Perform operational test of all systems involved to determine integrity of new installation.

C. Remove Right Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

NOTE: Engine oil temperature, engine oil pressure, and engine oil quantity, indicators are rack-and-panel mounted.

(2) Restrain each rack-and-panel mounted instrument by hand pressure around bezel, loosen mounting clamp adjustment screw, and allow instrument to eject slowly until spring pressure is relieved.

(3) Pull instruments clear of connector (about halfway out of cutout) and tighten mounting clamp adjustment screw.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING REMOVAL OPERATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(4) Inspect instruments for properly secured mounting.

(5) Restrain panel and remove attaching screws around perimeter. Carefully allow panel to eject until spring pressure is relieved.

(6) Lift panel out a few inches, and disconnect lines and electrical connectors.

(7) Carefully lower panel and remove from cavity.

(8) Tag and cap all lines, ports, and electrical connectors.

D. Install Right Panel.

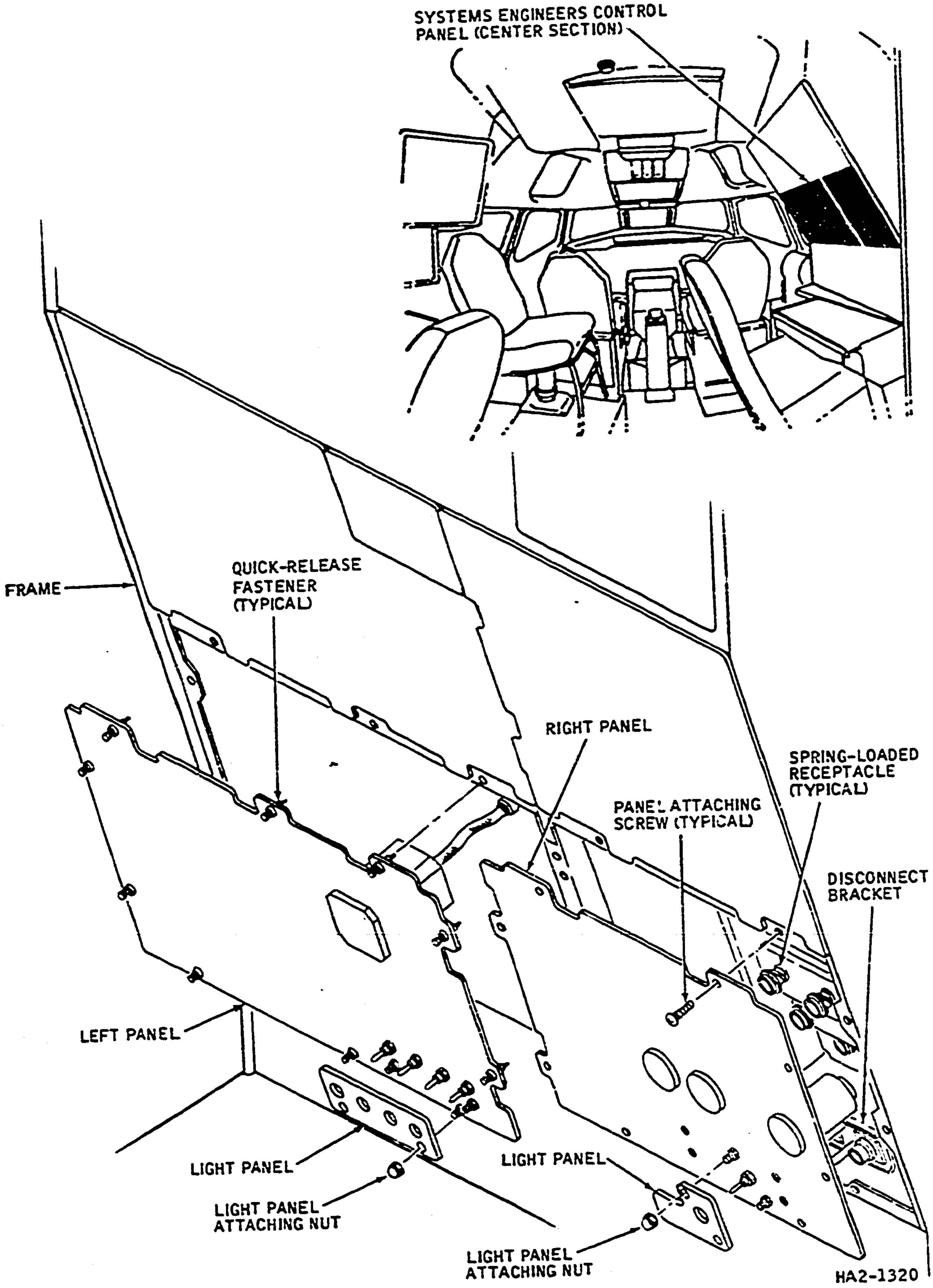
(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

NOTE: Rack-and-panel mounted instruments should be clamped in extended position.

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity, and connect all lines and electrical connectors.



Systems Engineer's Control Panel
(Center Section) Replacement
Figure 201

(5) Carefully position panel in cavity and apply pressure evenly to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure panel with attaching screws.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING INSTALLATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(7) Loosen clamp adjustment screws on rack-and-panel mounted instruments and press instruments into cavities.

(8) Tighten mounting clamps.

(9) Perform operational test of all systems involved to determine integrity of new installation.

SYSTEMS ENGINEER'S CONTROL PANEL (CENTER SECTION) - MAINTENANCE PRACTICES

1. General

   A. In order to remove the systems engineer's control panel (center section), it is necessary to remove all power from the airplane and to disconnect all electrical connectors from the instruments. The electrical leads from the smaller components mounted on the right panel are ganged into multiple-contact plugs mounted on a rack firmly fixed to the panel and designed to mate with spring-loaded, structure-mounted receptacles. The panel is subjected to heavy pressure, which must be relieved evenly when the panel is removed, allowing it to eject straight out, avoiding damage to the panel and electrical connectors.

   B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Systems Engineer's Panel (Center Section)

   A. Remove Left Panel.

      (1) Remove power from airplane.

      WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

      (2) Inspect instruments for properly secured mounting.

      (3) Release quick-release fasteners around perimeter of panel.

      (4) Lift panel out a few inches and disconnect lines and electrical connectors.

      (5) Carefully lower panel and remove from cavity.

      (6) Tag and cap all lines, ports, and electrical connectors.

   B. Install Left Panel.

      (1) Verify power is removed from airplane.

      (2) Check that all instruments are securely clamped in panel.

      (3) Remove all caps from lines, ports, and electrical connectors.

      (4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Position panel in cavity and secure with quick-release fasteners.

(6) Perform operational test of all systems involved to determine integrity of new installation.

C. Remove Right Panel.

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

NOTE: Engine oil temperature and engine oil pressure indicators are rack-and-panel mounted.

(2) Restrain each rack-and-panel mounted instrument by hand pressure around bezel, loosen mounting clamp adjustment screw, and allow instrument to eject slowly until spring pressure is relieved.

(3) Pull instruments clear of connector (about halfway out of cutout) and tighten mounting clamp adjustment screw.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING REMOVAL OPERATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(4) Inspect instruments for properly secured mounting.

(5) Restrain panel and remove attaching screws around perimeter. Carefully allow panel to eject until spring pressure is relieved.

(6) Lift panel out a few inches, and disconnect lines and electrical connectors.

(7) Carefully lower panel and remove from cavity.

(8) Tag and cap all lines, ports, and electrical connectors.

D. Install Right Panel.

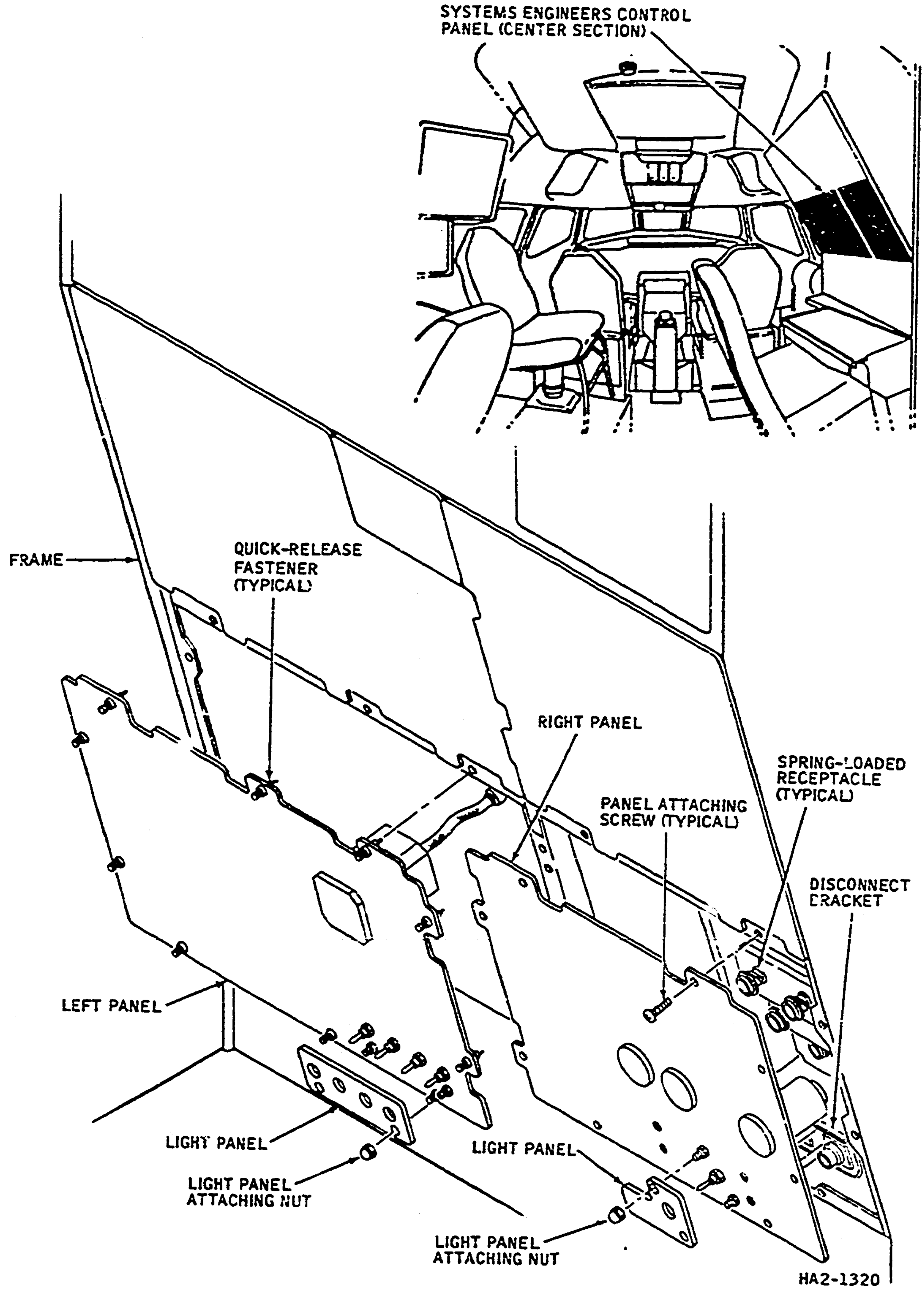
(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

NOTE: Rack-and-panel mounted instruments should be clamped in extended position.

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity, and connect all lines and electrical connectors.



Systems Engineer's Control Panel
(Center Section) Replacement
Figure 201

(5) Carefully position panel in cavity and apply pressure evenly to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure panel with attaching screws.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING INSTALLATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(7) Loosen clamp adjustment screws on rack-and-panel mounted instruments and press instruments into cavities.

(8) Tighten mounting clamps.

(9) Perform operational test of all systems involved to determine integrity of new installation.

SYSTEMS ENGINEER'S CONTROL PANEL (CENTER SECTION) - MAINTENANCE PRACTICES

1. General

A. In order to remove the systems engineer's control panel (center section), it is necessary to remove all power from the airplane and to disconnect all electrical connectors from the instruments. The electrical leads from the smaller components mounted on the right panel are ganged into multiple-contact plugs mounted on a rack firmly fixed to the panel and designed to mate with spring-loaded, structure-mounted receptacles. The panel is subjected to heavy pressure, which must be relieved evenly when the panel is removed, allowing it to eject straight out, avoiding damage to the panel and electrical connectors.

B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Systems Engineer's Panel (Center Section)

A. Remove Left Panel.

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

(2) Inspect instruments for properly secured mounting.

(3) Release quick-release fasteners around perimeter of panel.

(4) Lift panel out a few inches and disconnect lines and electrical connectors.

(5) Carefully lower panel and remove from cavity.

(6) Tag and cap all lines, ports, and electrical connectors.

B. Install Left Panel.

(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Position panel in cavity and secure with quick-release fasteners.

(6) Perform operational test of all systems involved to determine integrity of new installation.

C. Remove Right Panel.

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

NOTE: Engine oil temperature indicators, engine oil pressure indicators, and fuel flow meters are rack-and-panel mounted.

(2) Restrain each rack-and-panel mounted instrument by hand pressure around bezel, loosen mounting clamp adjustment screw, and allow instrument to eject slowly until spring pressure is relieved.

(3) Pull instruments clear of connector (about halfway out of cutout) and tighten mounting clamp adjustment screw.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING REMOVAL OPERATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(4) Inspect instruments for properly secured mounting.

(5) Restrain panel and remove attaching screws around perimeter. Carefully allow panel to eject until spring pressure is relieved.

(6) Lift panel out a few inches, and disconnect lines and electrical connectors.

(7) Carefully lower panel and remove from cavity.

(8) Tag and cap, all lines, ports, and electrical connectors.

D. Install Right Panel.

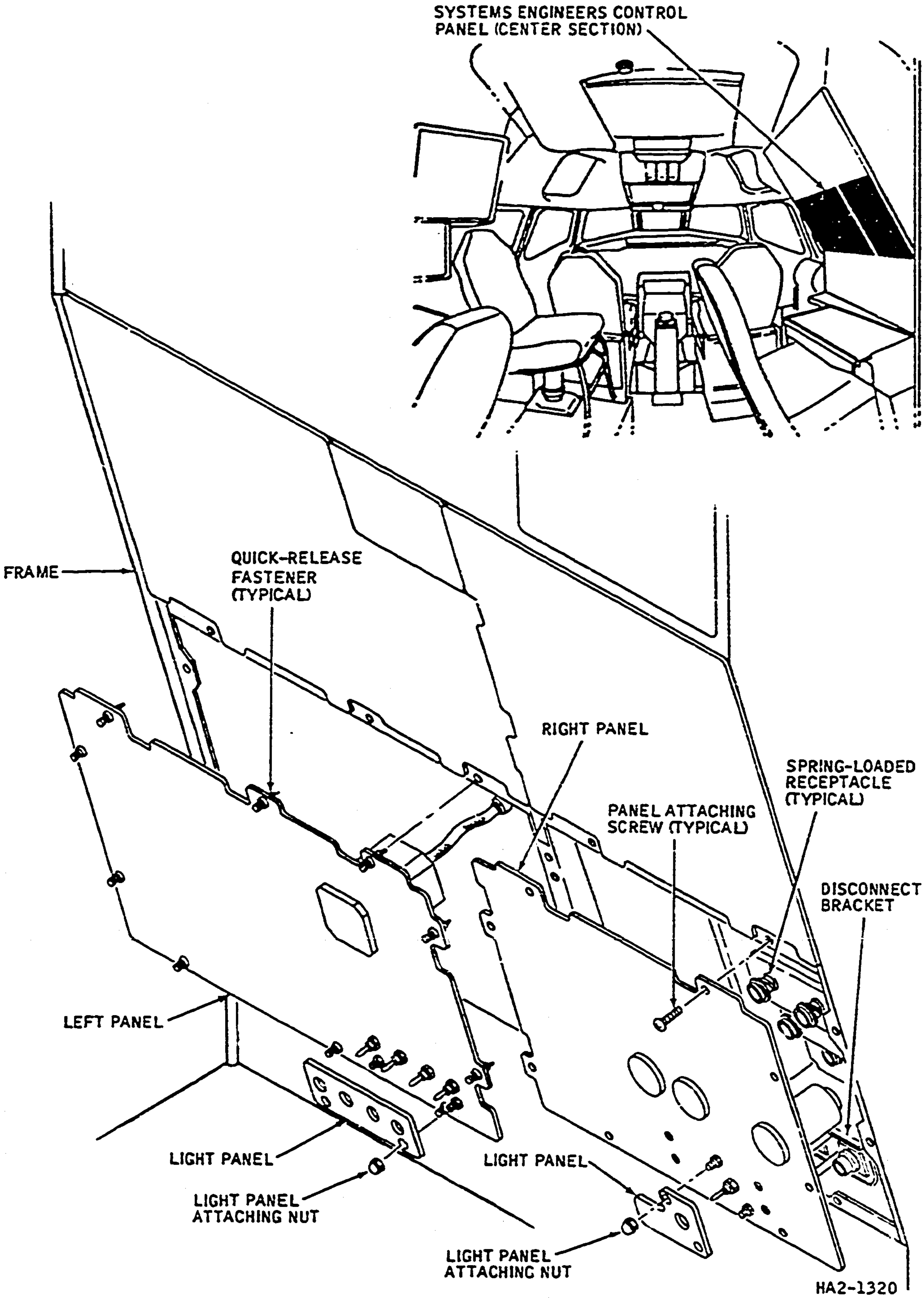
(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

NOTE: Rack-and-panel mounted instruments should be clamped in extended position.

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity, and connect all lines and electrical connectors.



Systems Engineer's Control Panel
(Center Section) Replacement
Figure 201

(5) Carefully position panel in cavity and apply pressure evenly to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure panel with attaching screws.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING INSTALLATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(7) Loosen clamp adjustment screws on rack-and-panel mounted instruments and press instruments into cavities.

(8) Tighten mounting clamps.

(9) Perform operational test of all systems involved to determine integrity of new installation.

SYSTEMS ENGINEER'S CONTROL PANEL (CENTER SECTION) - MAINTENANCE PRACTICES

1. General

A. In order to remove the systems engineer's control panel (center section), it is necessary to remove all power from the airplane and to disconnect all electrical connectors from the instruments. The electrical leads from the smaller components mounted on the right panel are ganged into multiple-contact plugs mounted on a rack firmly fixed to the panel and designed to mate with spring-loaded, structure-mounted receptacles. The panel is subjected to heavy pressure, which must be relieved evenly when the panel is removed, allowing it to eject straight out, avoiding damage to the panel and electrical connectors.

B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Systems Engineer's Panel (Center Section)

A. Remove Left Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

NOTE: Engine oil temperature and engine oil pressure indicators are rack-and-panel mounted.

(2) Restrain each rack-and-panel mounted instrument by hand pressure around bezel, loosen mounting clamp adjustment screw, and allow instrument to eject slowly until spring pressure is relieved.

(3) Pull instruments clear of connector (about halfway out of cutout) and tighten mounting clamp adjustment screw.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING REMOVAL OPERATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

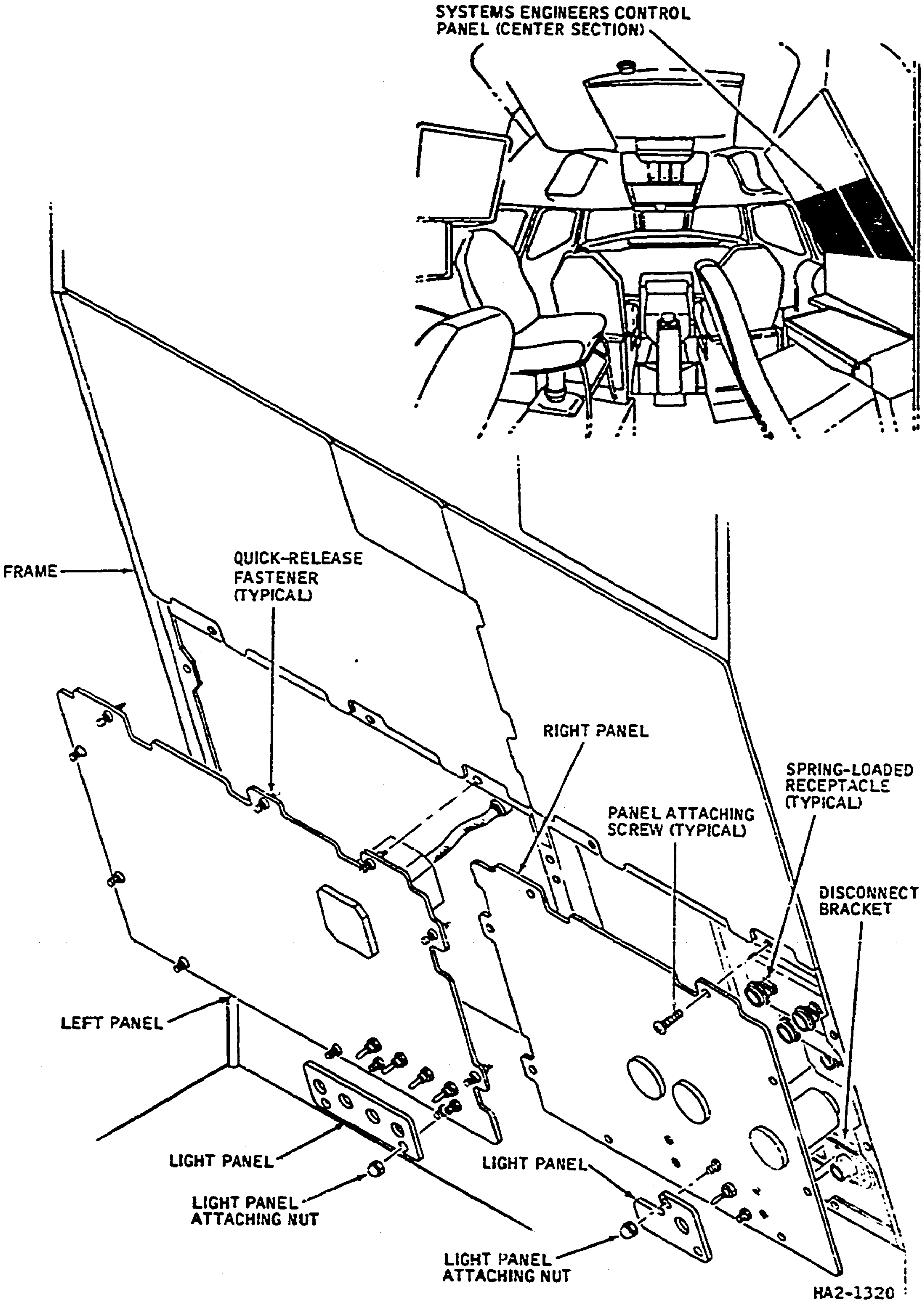
(4) Inspect instruments for properly secured mounting.

(5) Restrain panel and release quick-release fasteners around perimeter. Carefully allow panel to eject until spring pressure is relieved.

(6) Lift panel out a few inches, and disconnect lines and electrical connectors.

(7) Carefully lower panel and remove from cavity.

(8) Tag and cap all lines, ports, and electrical connectors.



Systems Engineer's Control Panel
(Center Section) Replacement
Figure 201

B. Install Left Panel

(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

NOTE: Rack-and-panel mounted instruments should be clamped in extended position.

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Carefully position panel in cavity and apply pressure evenly to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure panel with quick-release fasteners.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING INSTALLATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(7) Loosen clamp adjustment screws on rack-and-panel mounted instruments and press instruments into cavities.

(8) Tighten mounting clamps.

(9) Perform operational test of all systems involved to determine integrity of new installation.

C. Remove Right Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

(2) Inspect instruments for properly secured mounting.

(3) Remove attaching screws around perimeter of panel.

(4) Lift panel out a few inches and disconnect lines and electrical connectors.

(5) Carefully lower panel and remove from cavity.

(6) Tag and cap all lines, ports, and electrical connectors.

D. Install Right Panel

(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Position panel in cavity and secure with attaching screws.

(6) Perform operational test of all systems involved to determine integrity of new installation.

SYSTEMS ENGINEER'S CONTROL PANEL (CENTER SECTION) - MAINTENANCE PRACTICES

1. General

A. In order to remove the systems engineer's control panel (center section), it is necessary to remove all power from the airplane and to disconnect all electrical connectors from the instruments. The electrical leads from the smaller components mounted on the right panel are ganged into multiple-contact plugs mounted on a rack firmly fixed to the panel and designed to mate with spring-loaded, structure-mounted receptacles. The panel is subjected to heavy pressure, which must be relieved evenly when the panel is removed, allowing it to eject straight out, avoiding damage to the panel and electrical connectors.

B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Systems Engineer's Panel (Center Section)

A. Remove Left Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

NOTE: Engine oil temperature, engine oil pressure, and tachometer indicators are rack-and-panel mounted.

(2) Restrain each rack-and-panel mounted instrument by hand pressure around bezel, loosen mounting clamp adjustment screw, and allow instrument to eject slowly until spring pressure is relieved.

(3) Pull instruments clear of connector (about halfway out of cutout) and tighten mounting clamp adjustment screw.

CAUTION: AVOID ROTATION OF INSTRUMENTS DURING REMOVAL OPERATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(4) Inspect instruments for properly secured mounting.

(5) Restrain panel and release quick-release fasteners around perimeter. Carefully allow panel to eject until spring pressure is relieved.

(6) Lift panel out a few inches, and disconnect lines and electrical connectors.

(7) Carefully lower panel and remove from cavity.

(8) Tag and cap all lines, ports, and electrical connectors.

B. Install Left Panel

(1) Verify power is removed from airplane.

(2) Check that all instruments are securely clamped in panel.

<u>NOTE:</u> Rack-and-panel mounted instruments should be clamped in extended position.

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Carefully position panel in cavity and apply pressure evenly to compress structure-mounted receptacle springs, allowing plugs and receptacles to mate.

(6) Secure panel with quick-release fasteners.

<u>CAUTION:</u> AVOID ROTATION OF INSTRUMENTS DURING INSTALLATION TO AVOID DAMAGE TO ELECTRICAL CONNECTORS.

(7) Loosen clamp adjustment screws on rack-and-panel mounted instruments into cavities.

(8) Tighten mounting clamps.

(9) Perform operational test of all systems involved to determine integrity of new installation.

C. Remove Right Panel

(1) Remove power from airplane.

<u>WARNING:</u> TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

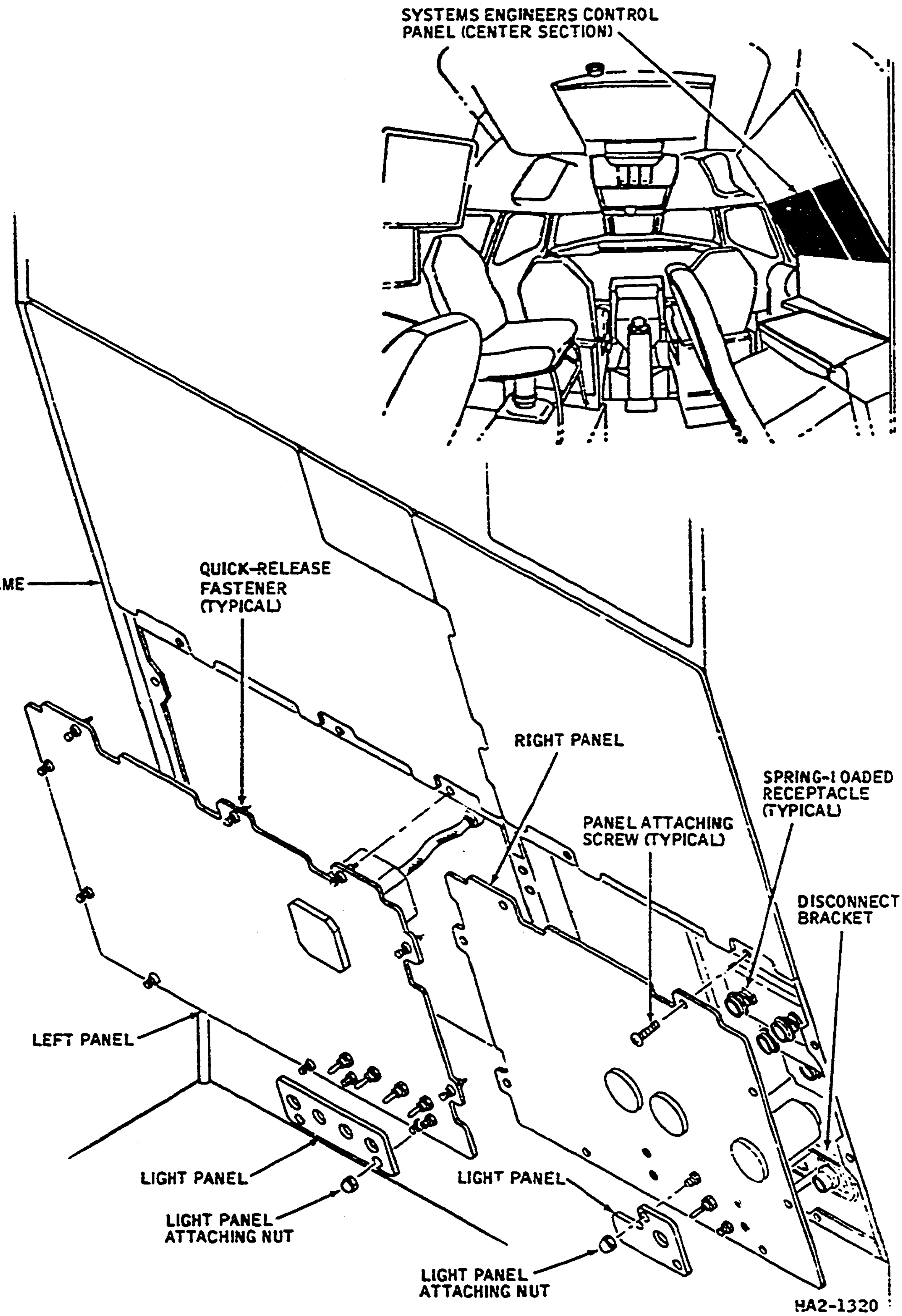
(2) Inspect instruments for properly secured mounting.

(3) Remove attaching screws around perimeter of panel.

(4) Lift panel out a few inches and disconnect lines and electrical connectors.

(5) Carefully lower panel and remove from cavity.

(6) Tag and cap all lines, ports, and electrical connectors.



Systems Engineer's Control Panel
(Center Section) Replacement
Figure 201

D. Install Right Panel

(1) Verify power is removed from airplane.

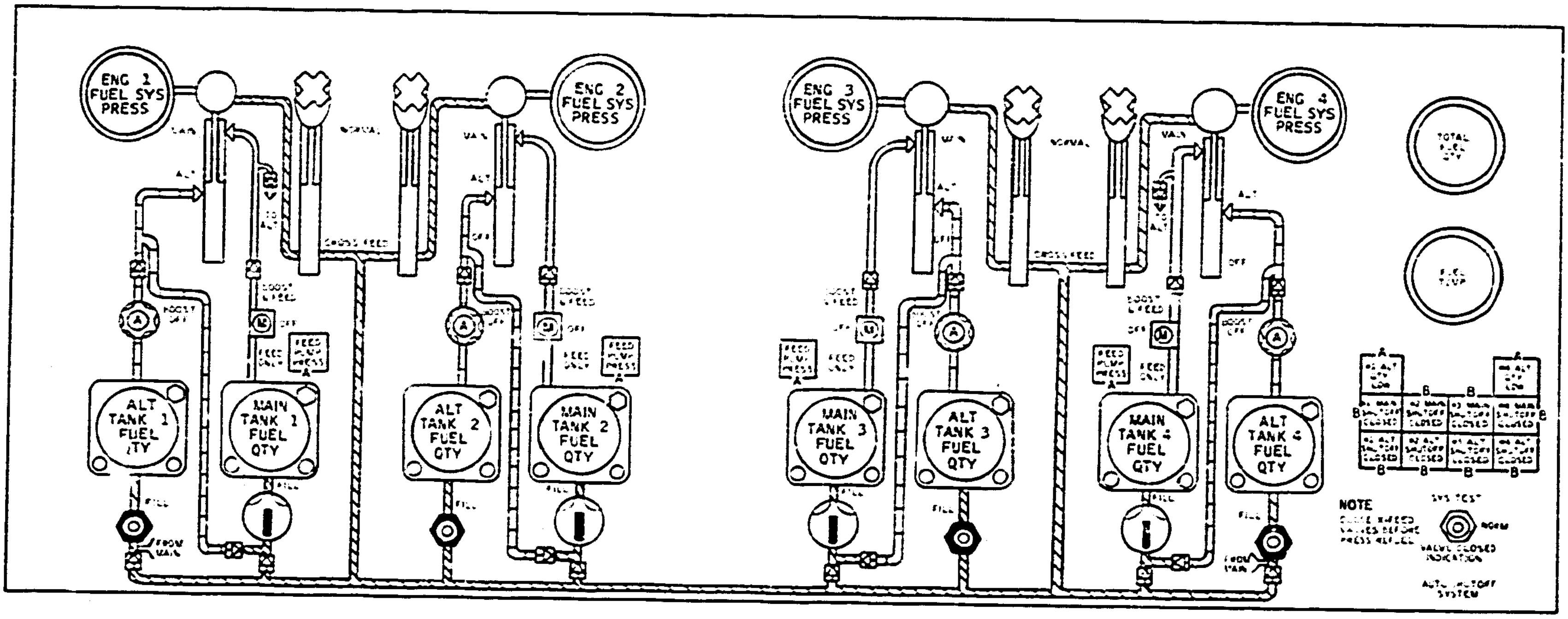
(2) Check that all instruments are securely clamped in panel.

(3) Remove all caps from lines, ports, and electrical connectors.

(4) Position panel a few inches from cavity, and connect all lines and electrical connectors.

(5) Position panel in cavity and install attaching screws.

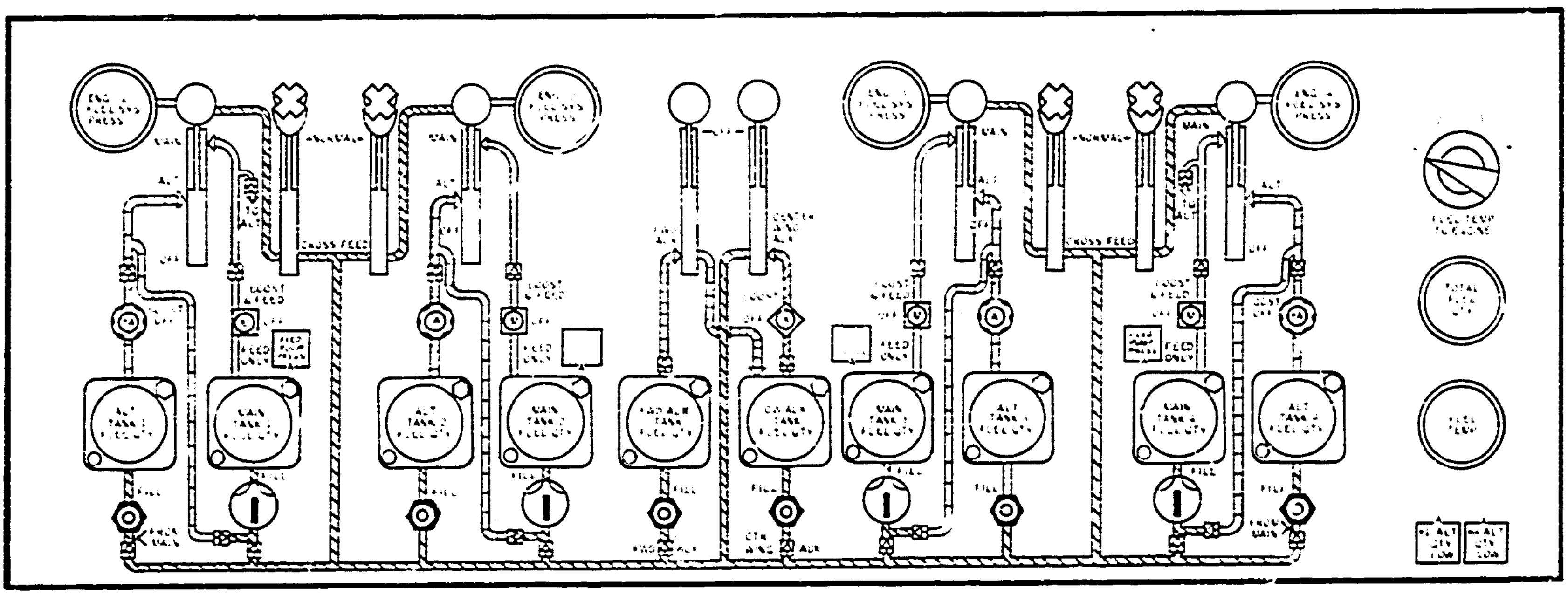
(6) Perform operational test of all systems involved to determine integrity of new installation.



A = AMBER INDICATING LIGHT
"A" ON BOOST PUMP SWITCHES INDICATES "ALTERNATE"
B = BLUE INDICATING LIGHT
M = MAIN TANK BOOST PUMP SWITCH
◎ = LEVER-LOCK SWITCH

HA2-1260

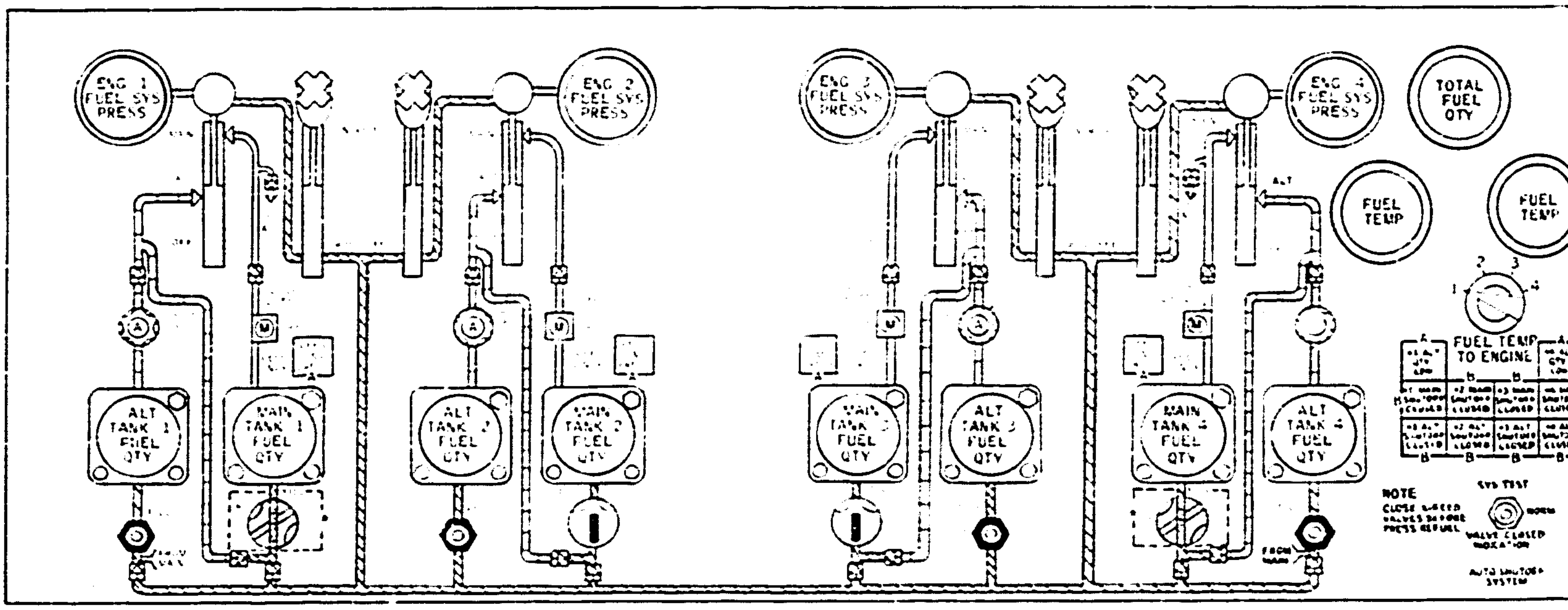
Systems Engineer's Control Panel (Lower Section)
Figure 1



A = AMBER INDICATING LIGHT
"A" ON BOOST PUMP SWITCH INDICATES "ALTERNATE"
M = MAIN TANK BOOST PUMP SWITCH
⊙ - LEVER-LOCK SWITCH

1M2-1332

Systems Engineer's Control Panel (Lower Section)
Figure 1



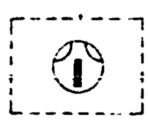
A - AMBER INDICATING LIGHT

"A" ON BOOST PUMP SWITCHES INDICATES "ALTERNATE"

B - BLUE INDICATING LIGHT

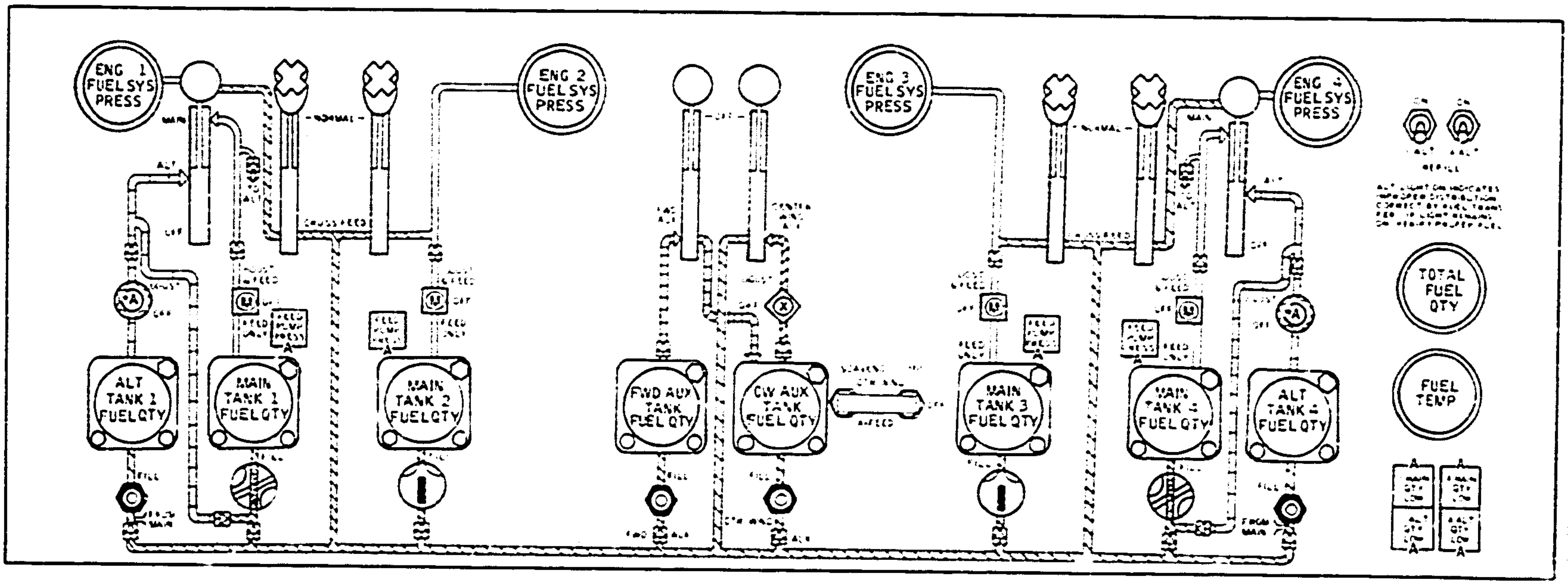
M - MAIN TANK BOOST PUMP SWITCH

LEVER-LOCK SWITCH



* INSTALLED ON

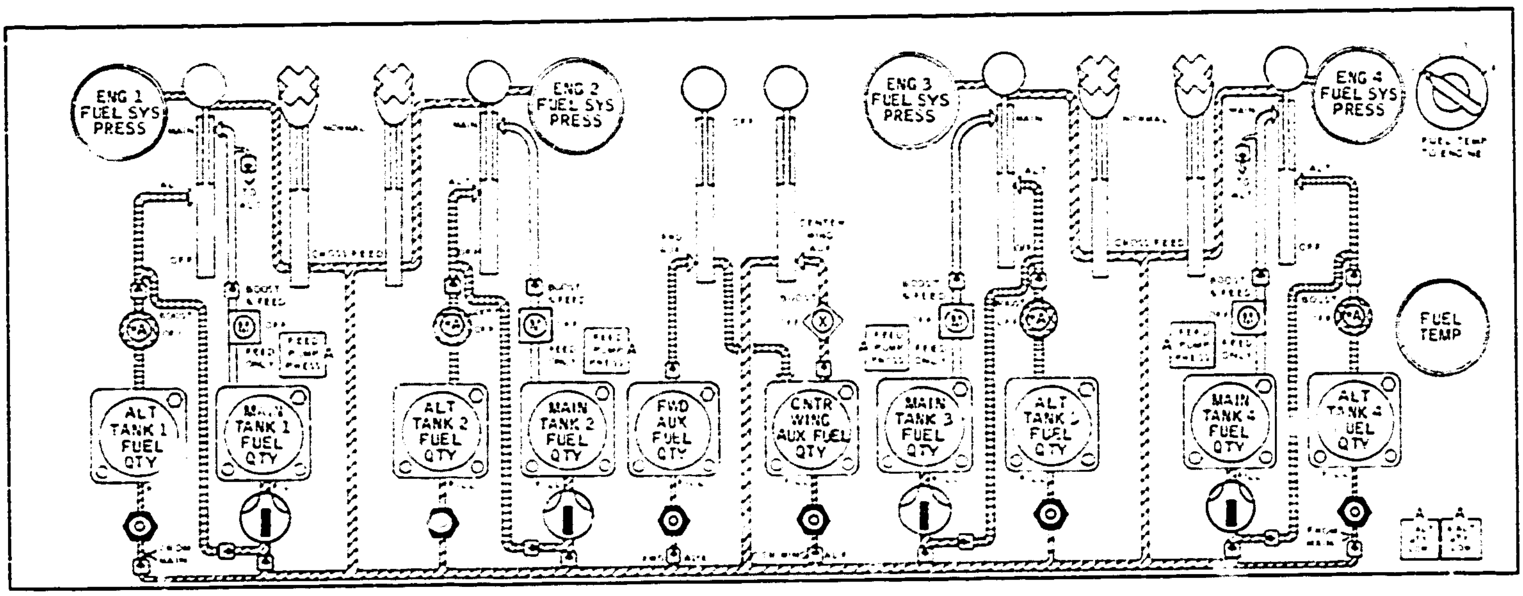
Systems Engineer's Control Panel (Lower Section)
Figure 1



A = AMBER INDICATING LIGHT
* "A" ON BOOST PUMP SWITCH INDICATES "ALTERNATE"
M = MAIN TANK BOOST PUMP SWITCH
X = AUXILIARY TANK BOOST PUMP SWITCH
⊙ = LEVER-LOCK SWITCH

HA2-4157A

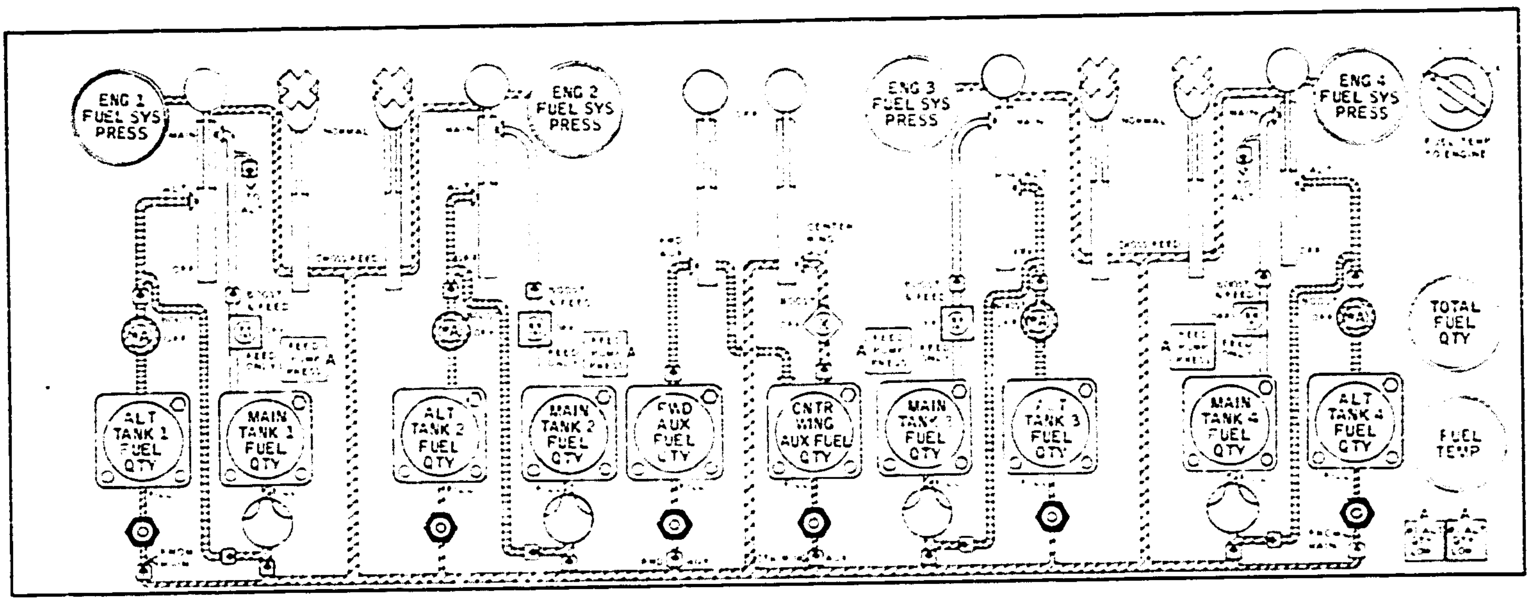
Systems Engineer's Control Panel (Lower Section)
Figure 1



A = AMBER INDICATING LIGHT
• "A" ON BOOST PUMP SWITCH INDICATES "ALTERNATE"
M = MAIN TANK BOOST PUMP SWITCH
X = AUXILIARY TANK BOOST PUMP SWITCH
◎ = LEVER-LOCK SWITCH

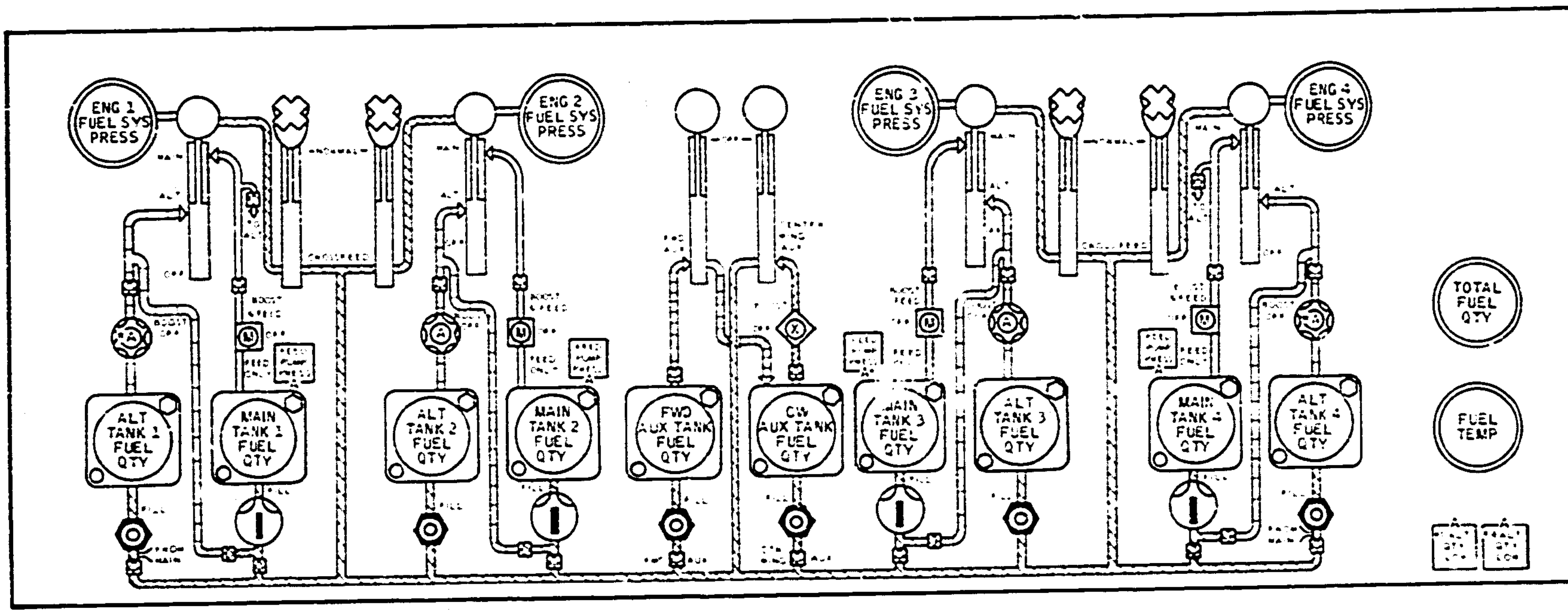
HA2-3608B

Systems Engineer's Control Panel (Lower Section)
Figure 1



A = AMBER INDICATING LIGHT
* "A" ON BOOST PUMP SWITCH INDICATES "ALTERNATE"
M = MAIN TANK BOOST PUMP SWITCH
X = AUXILIARY TANK BOOST PUMP SWITCH
◎ = LEVER-LOCK SWITCH

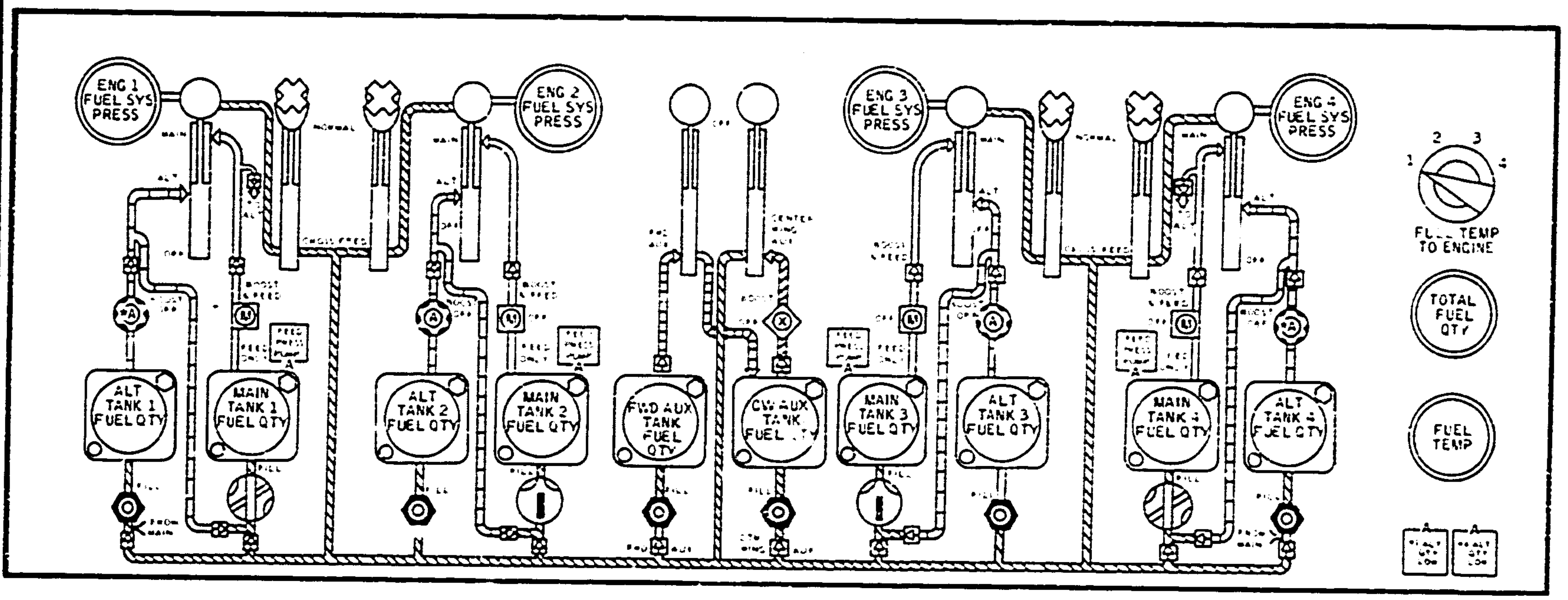
Systems Engineer's Control Panel (Lower Section)
Figure 1



A - AMBER INDICATING LIGHT
* "A" ON BOOST PUMP SWITCH INDICATES "ALTERNATE"
M = MAIN TANK BOOST PUMP SWITCH
X = AUXILIARY TANK BOOST PUMP SWITCH
(symbol) = LEVER LOCK SWITCH

HA2-3725A

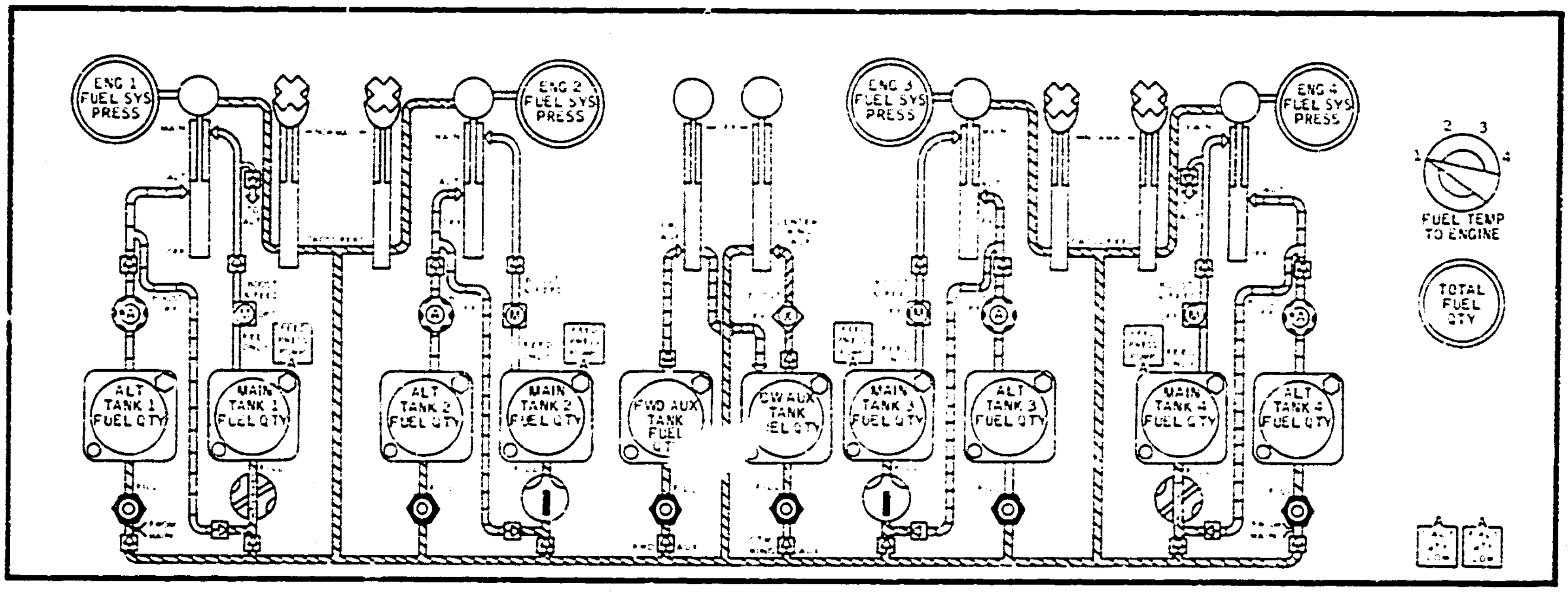
Section Engineer's Control Panel (Lower Section)
Figure 1



A = AMBER INDICATING LIGHT
* "A" ON BOOST PUMP SWITCH INDICATES "ALTERNATE"
M = MAIN TANK BOOST PUMP SWITCH
X = AUXILIARY TANK BOOST PUMP SWITCH
⊚ = LEVER-LOCK SWITCH

HA2-3727A

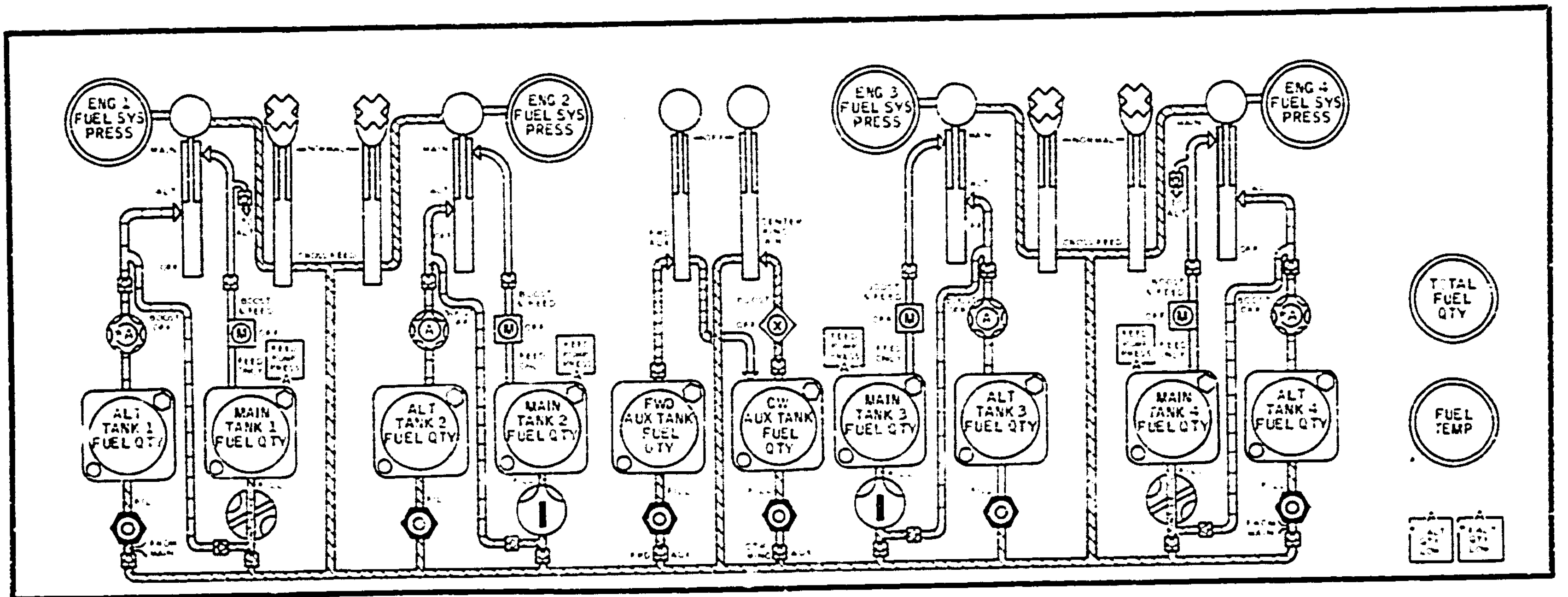
Systems Engineer's Control Panel (Lower Section)
Figure 1



A - AMBER INDICATING LIGHT
* "A" ON BOOST PUMP SWITCH INDICATES "ALTERNATE"
M = MAIN TANK BOOST PUMP SWITCH
X = AUXILIARY TANK BOOST PUMP SWITCH
(symbol) = LEVER-LOCK SWITCH

HA2-3728

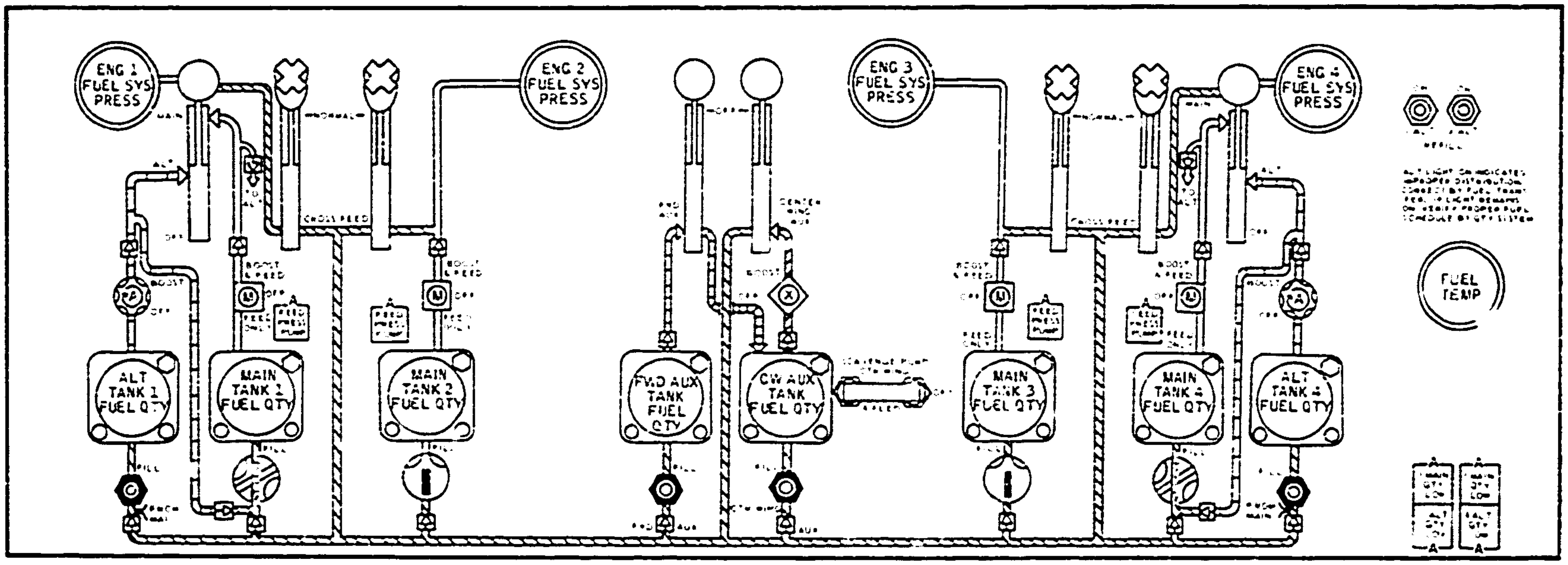
Sustems Engineer's Control Panel (Lower Section)
Figure 1



A = AMBER INDICATING LIGHT
★ - A - ON BOOST PUMP SWITCH INDICATES "ALTERNATE"
M = MAIN TANK BOOST PUMP SWITCH
X = AUXILIARY TANK BOOST PUMP SWITCH
(O) = LEVER-LOCK SWITCH

Sustems Enigeer's Control Panel (Lower Section)
Figure 1

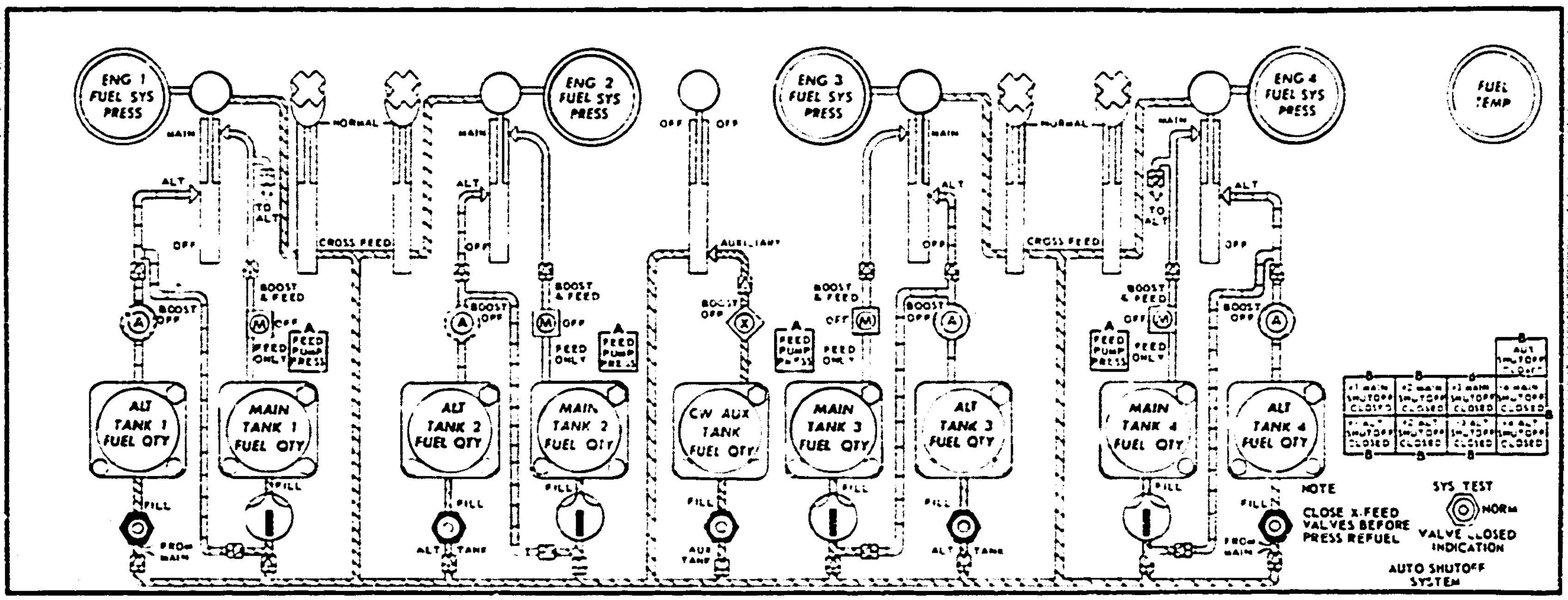
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A = AMBER INDICATING LIGHT
* "A" ON BOOST PUMP SWITCH INDICATES "ALTERNATE"
M = MAIN TANK BOOST PUMP SWITCH
X = AUXILIARY TANK BOOST PUMP SWITCH
⬢ = LEVER-LOCK SWITCH

HA2-3726A

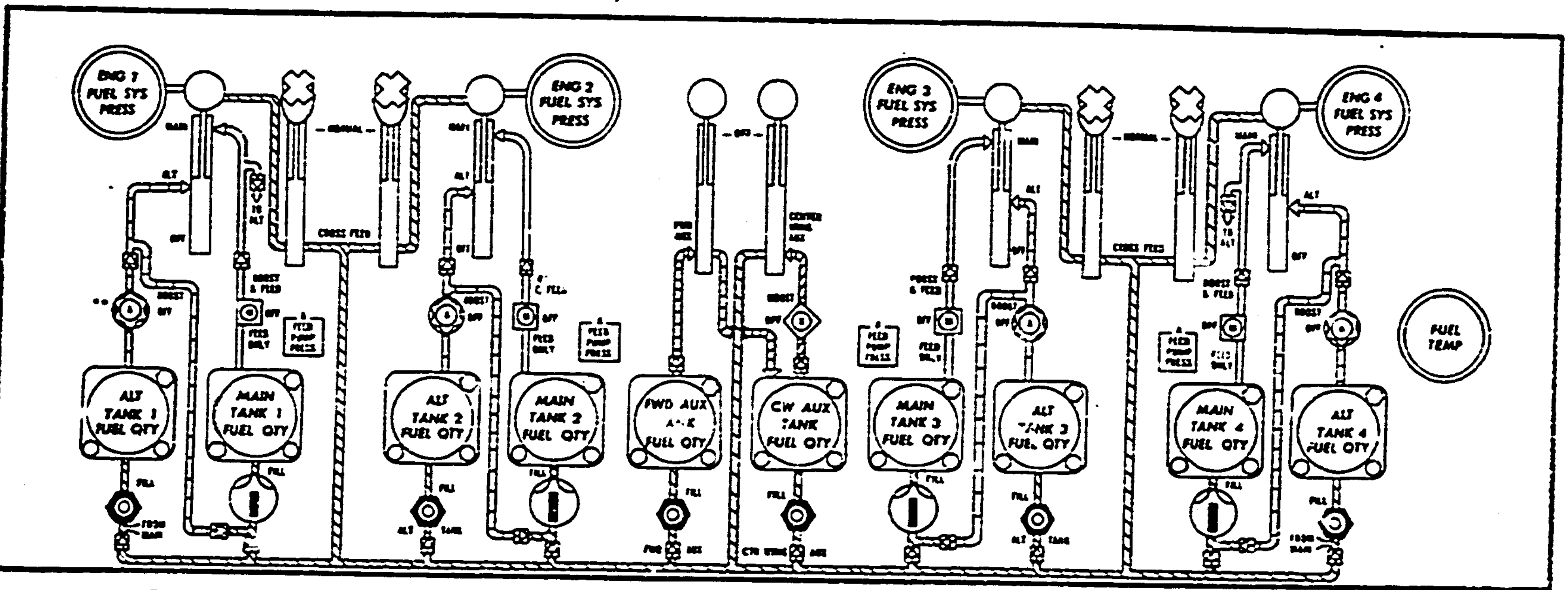
Systems Engineer's Control Panel (Lower Section)
Figure 1



A = AMBER INDICATING LIGHT
"A" ON BOOST PUMP SWITCH INDICATES "ALTERNATE"
B = BLUE INDICATING LIGHT
X = AUXILIARY TANK BOOST PUMP SWITCH
M = MAIN TANK BOOST PUMP SWITCH
◯ = LEVER-LOCK SWITCH

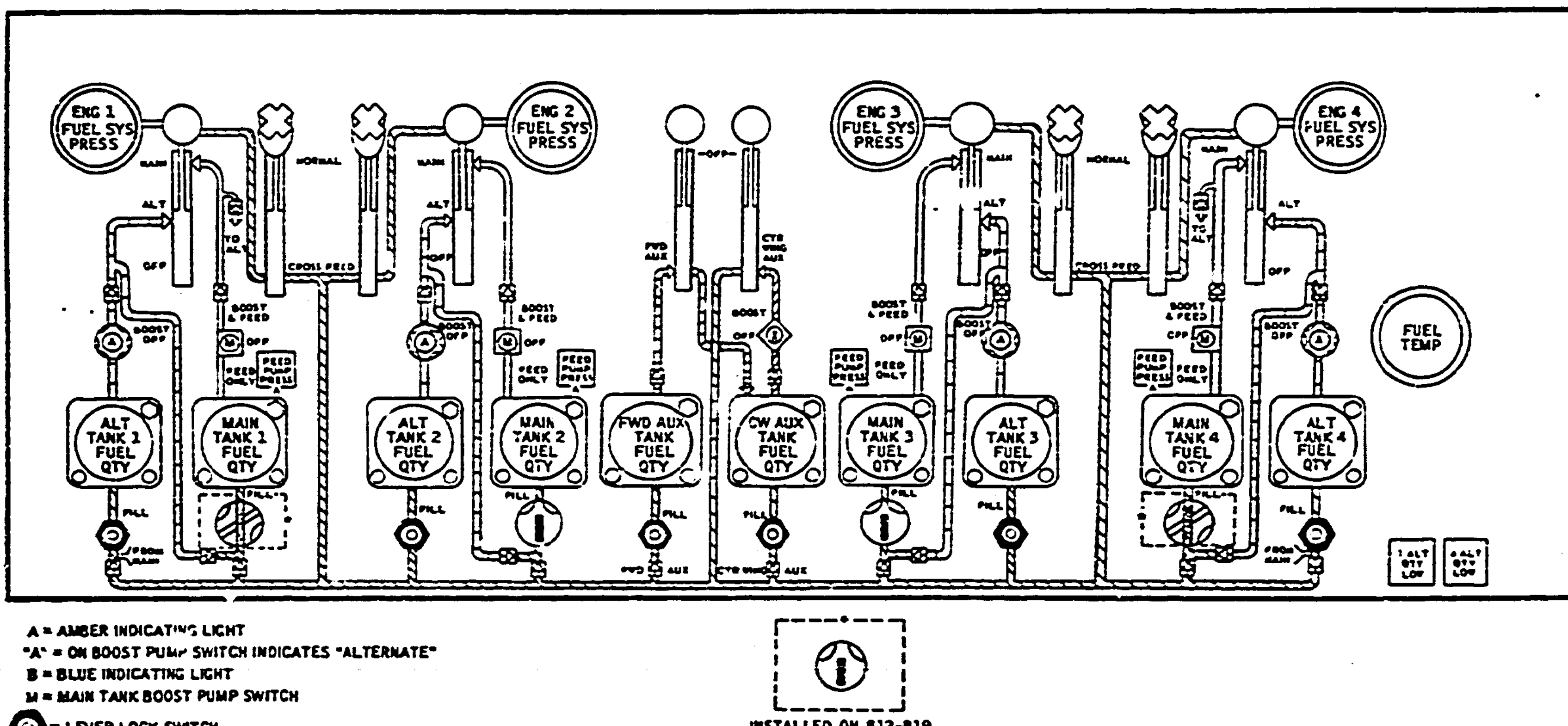
HA2-6840

Systems Engineer's Control Panel (Lower Section)
Figure 1

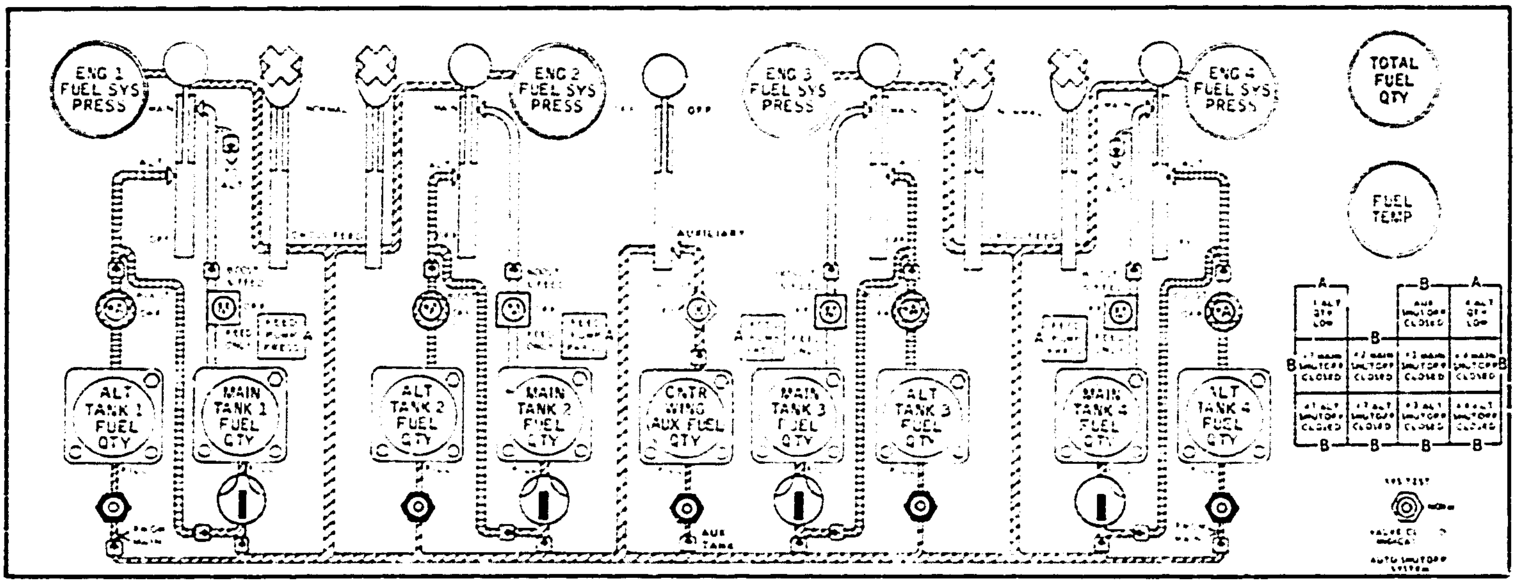


A = AMBER INDICATING LIGHT
** "A" ON BOOST PUMP SWITCH INDICATES "ALTERNATE"
X = AUXILIARY TANK BOOST PUMP SWITCH
M = MAIN TANK BOOST PUMP SWITCH
O = LEVER-LOCK SWITCH

Systems Engineer's Control Panel (Lower Section)
Figure 1



System Engineer's Control Panel (Lower Section)
Figure 1

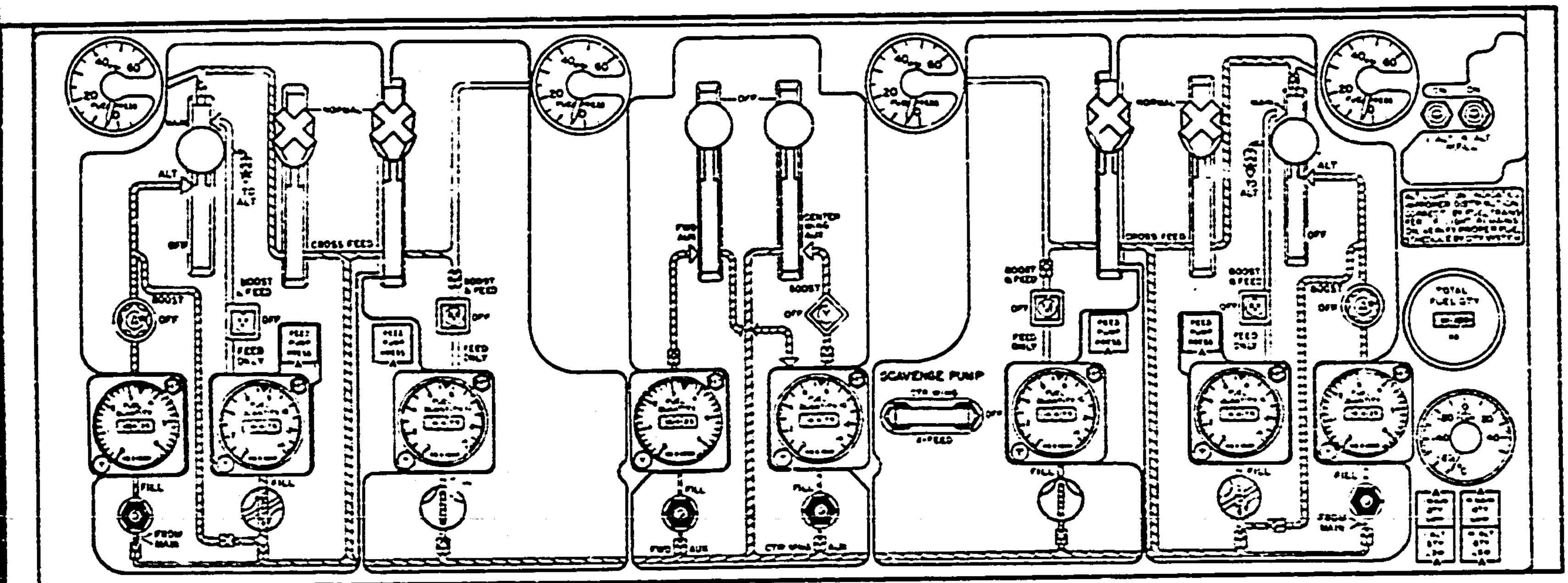


A = AMBER INDICATING LIGHT
"A" = ON BOOST PUMP SWITCHES INDICATES "ALTERNATE"
B = BLUE INDICATING LIGHT
M = MAIN TANK BOOST PUMP SWITCH
= LEVER-LOCK SWITCH

HA2-5770

Systems Engineer's Control Panel
(Lower Section)
Figure 1

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A = AMBER INDICATING LIGHT
*"A" ON BOOST PUMP SWITCH INDICATES "ALTERNATE"
M = MAIN TANK BOOST PUMP SWITCH
X = AUXILIARY TANK BOOST PUMP SWITCH
⊙ = LEVER-LOCK SWITCH

HA2-6894

Systems Engineer's Control Panel (Lower Section)
Figure 1

SYSTEMS ENGINEER'S CONTROL PANEL (LOWER SECTION) - MAINTENANCE PRACTICES

1. General

A. In order to remove the systems engineer's control panel (lower section) it is necessary to remove all power from the airplane and to disconnect all electrical connectors from the instruments. Control knobs from the fuel selector levers should be removed before removal of the panel.

B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Systems Engineer's Control Panel (Lower Section)

A. Remove Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

(2) Remove fuel selector knobs from fuel selector levers.

(3) Manually support panel and release quick-release fasteners around perimeter.

(4) Lift panel out a few inches and disconnect electrical connectors.

(5) Remove panel.

(6) Tag and cap all hoses, ports, and electrical connectors.

B. Install Panel

(1) Verify power is removed from airplane.

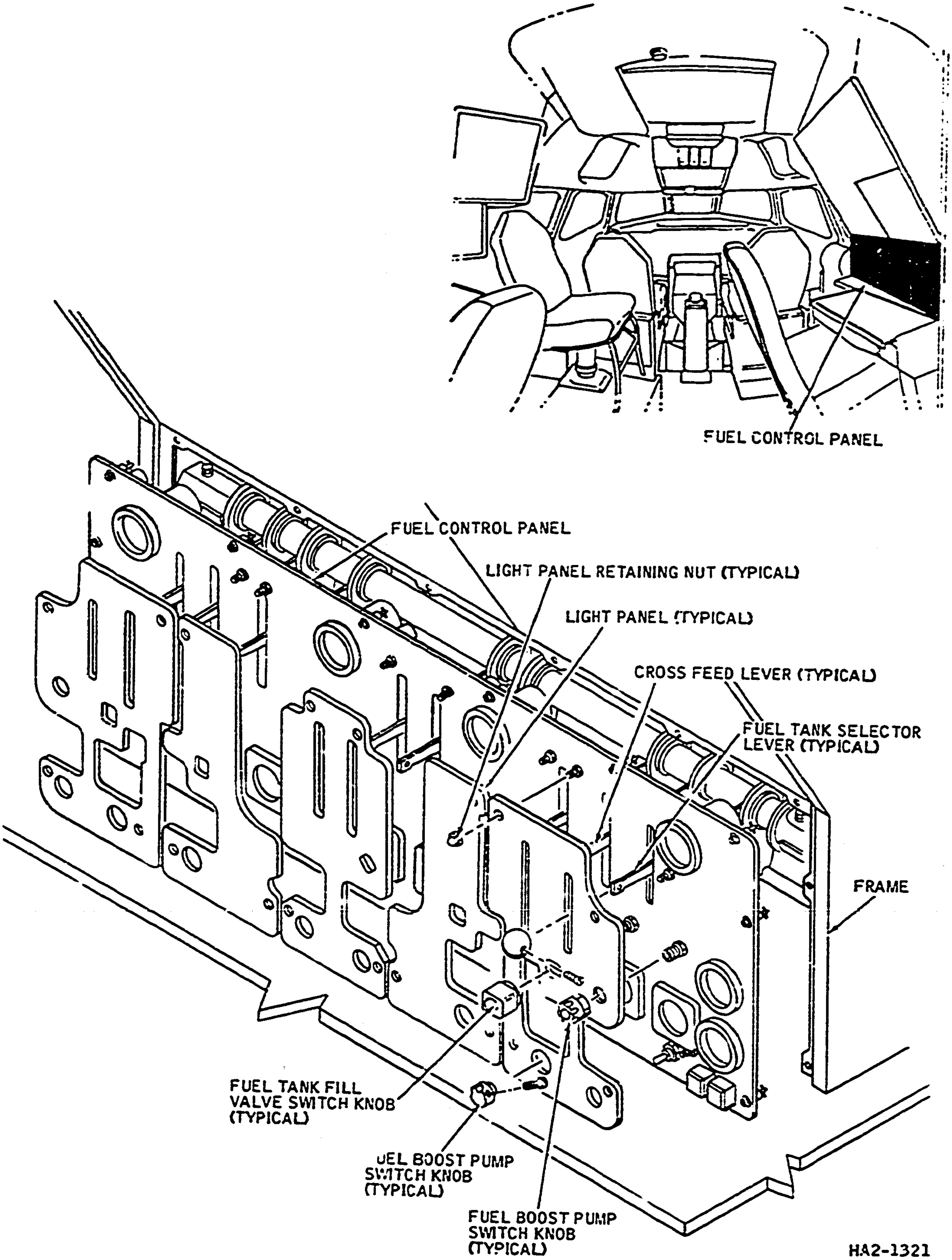
(2) Remove all caps from hoses and electrical connectors.

(3) Carefully place panel a few inches in front of cavity and connect electrical connectors.

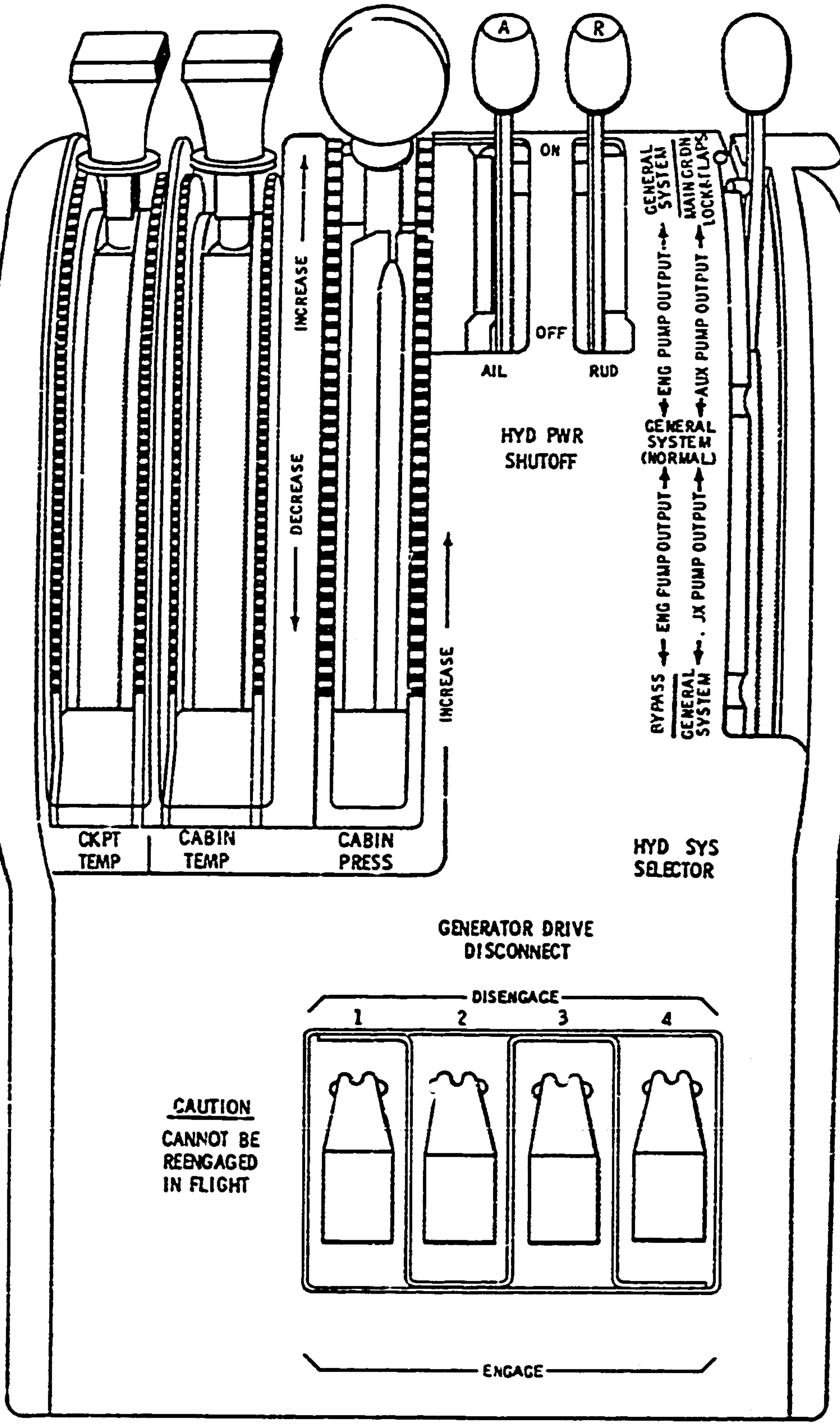
(4) Secure panel in cavity with quick-release fasteners around perimeter.

(5) Install fuel selector knobs on levers.

(6) Perform operational test of all systems involved to determine integrity of new installation.

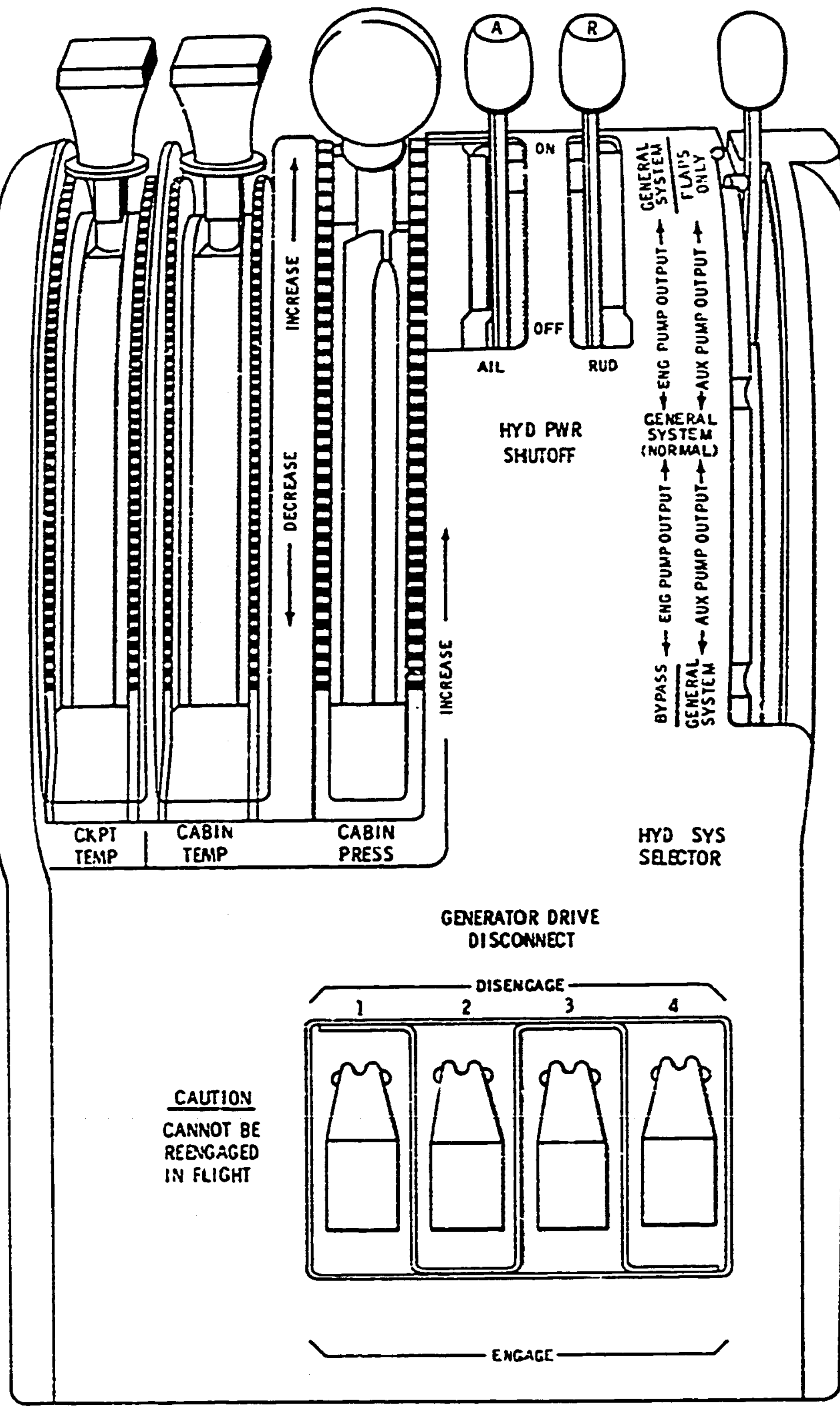


Systems Engineer's Control Panel
(Lower Section) Replacement
Figure 201

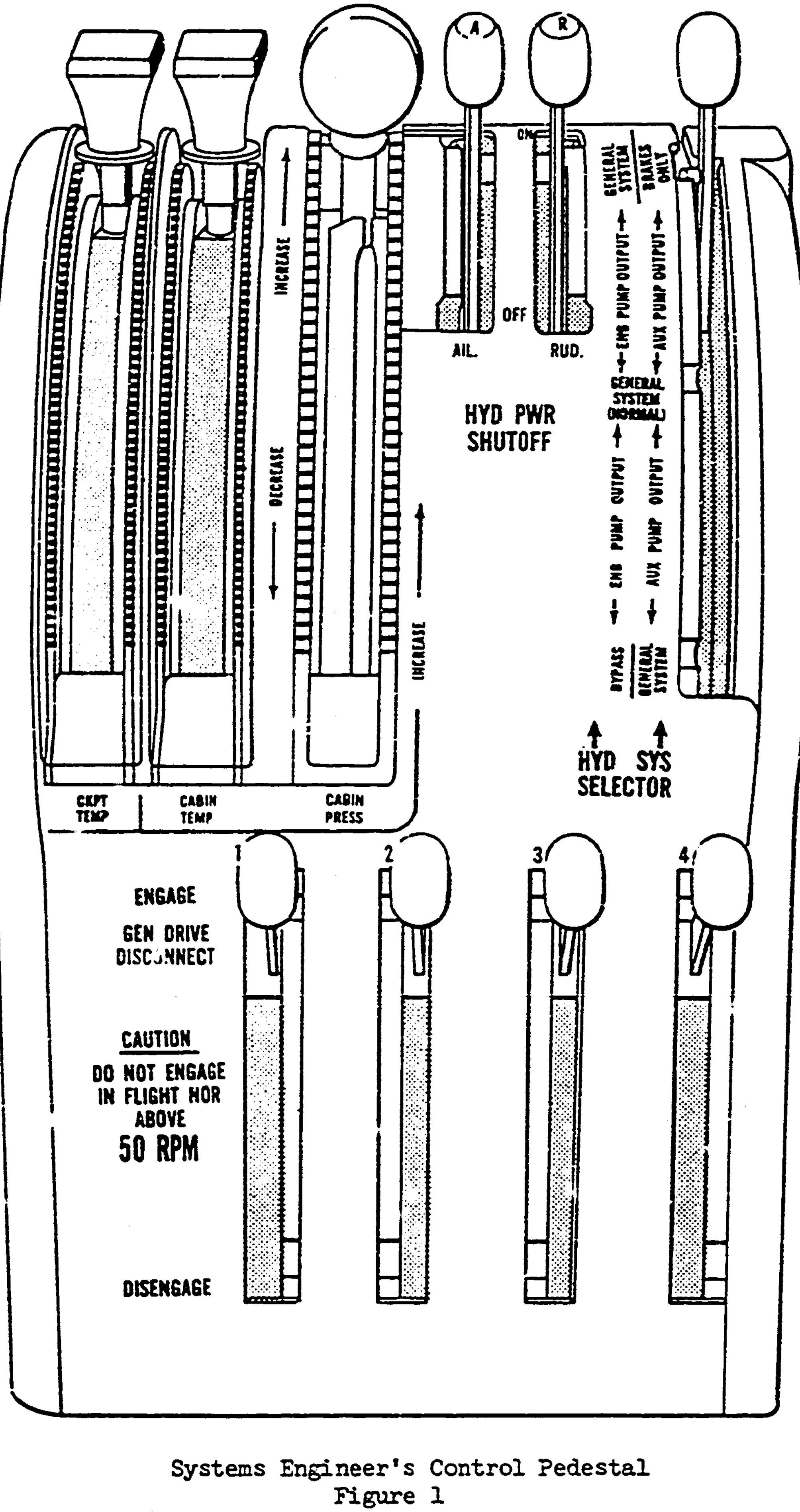


KA2-1219

Systems Engineer's Control Pedestal
Figure 1

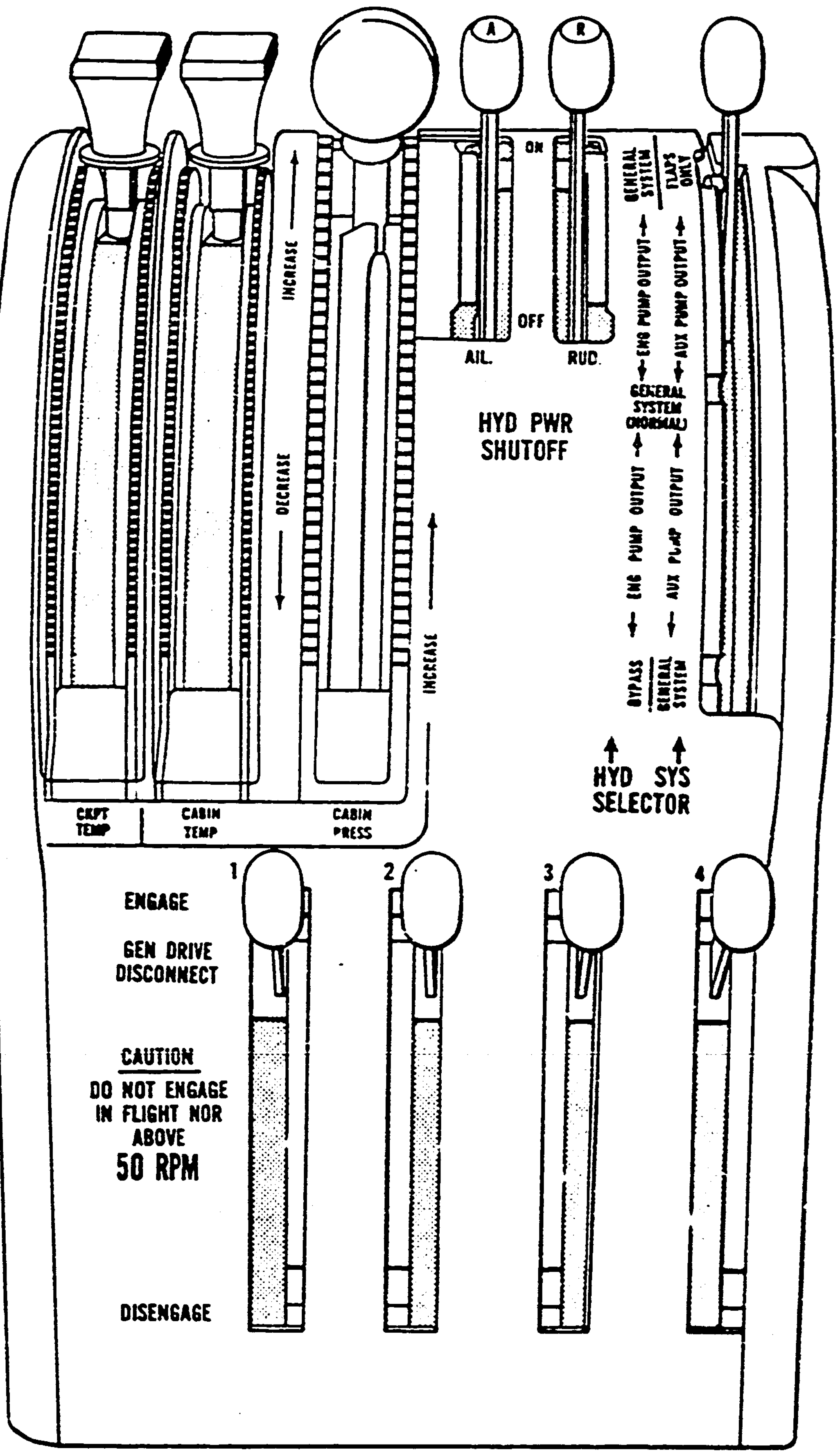


Systems Engineer's Control Pedestal
Figure 1



H1-15

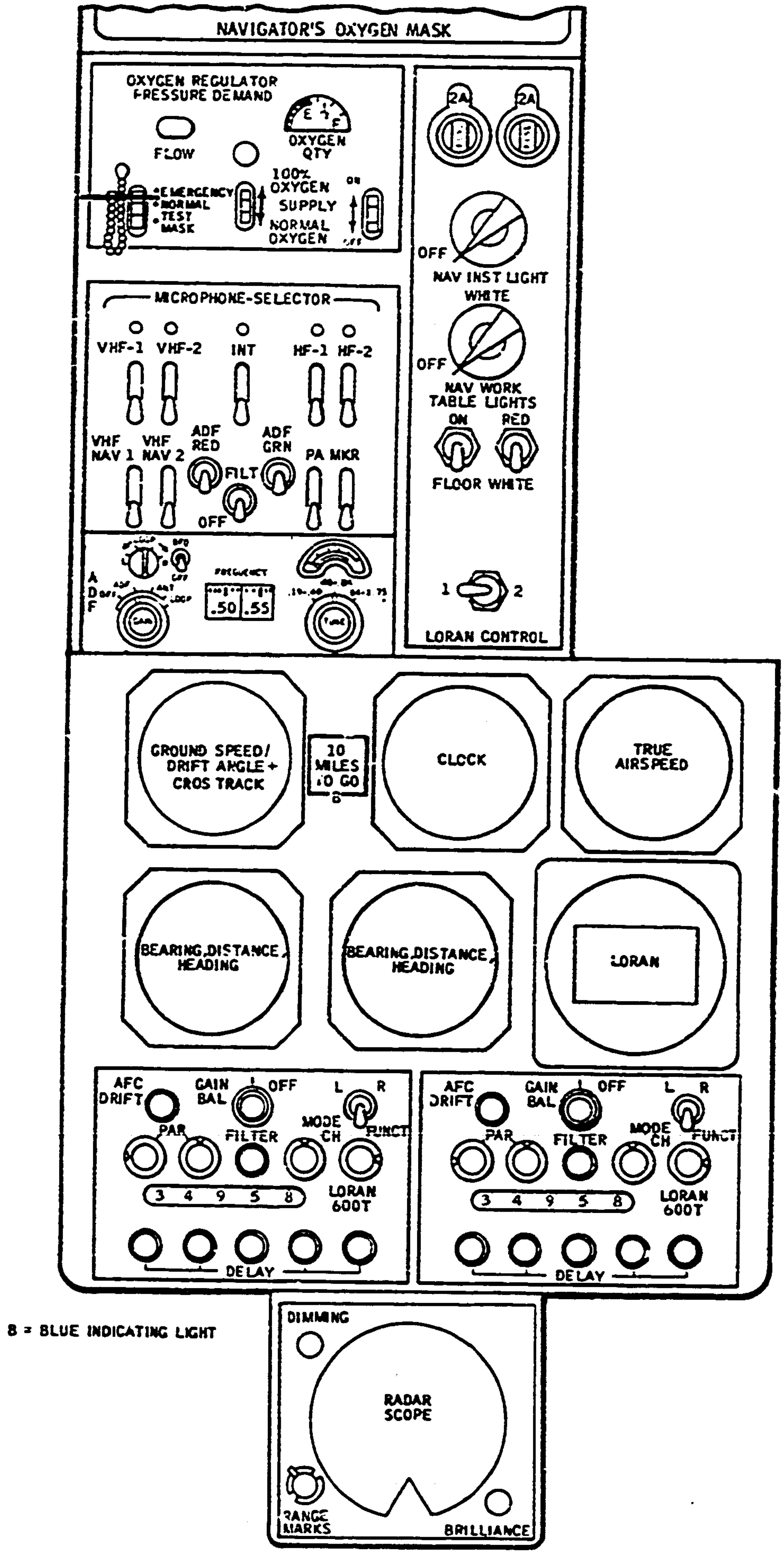
Systems Engineer's Control Pedestal
Figure 1



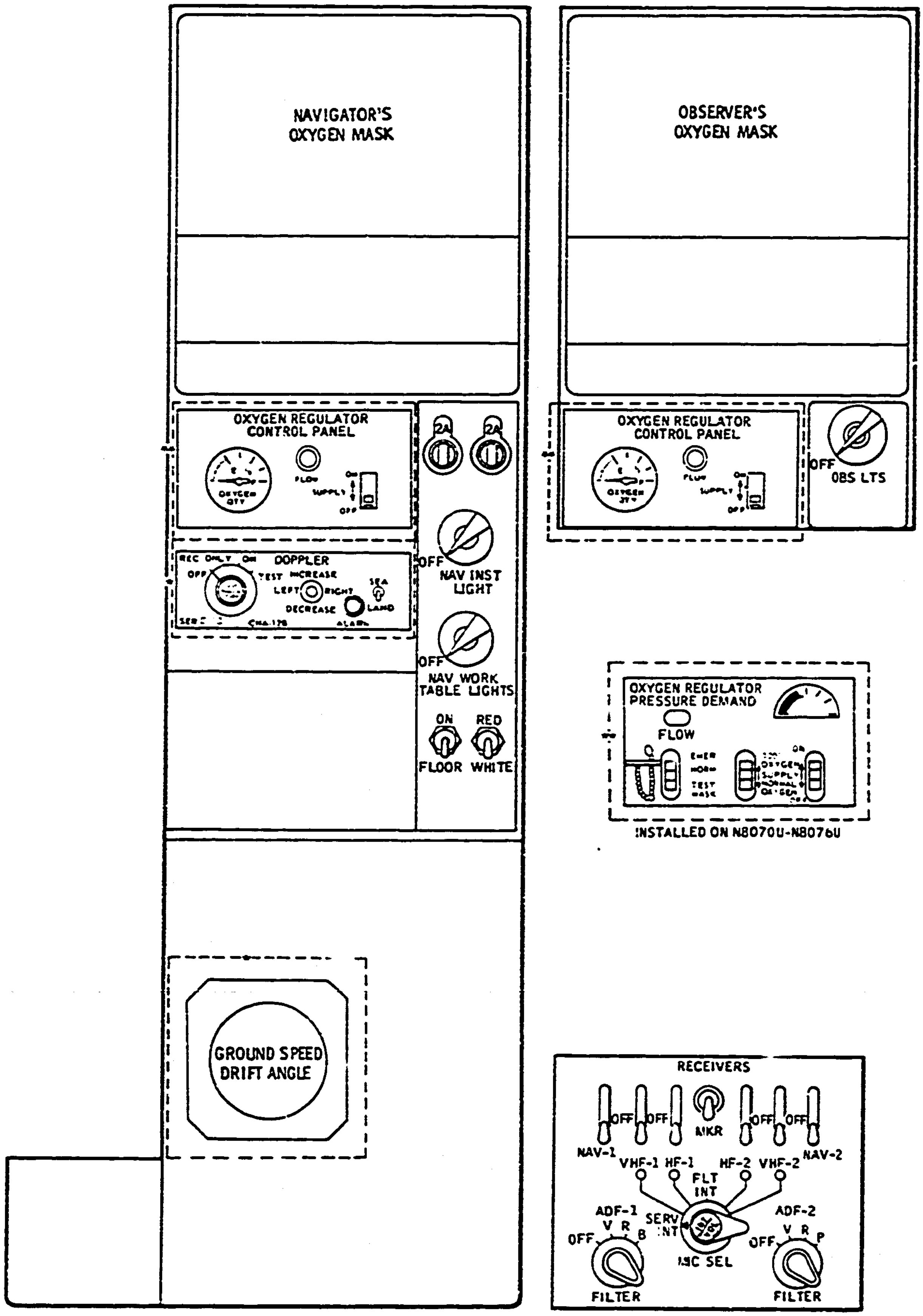
H1-759

Systems Engineer's Control Pedestal
Figure 1

Printed in U.S.A.



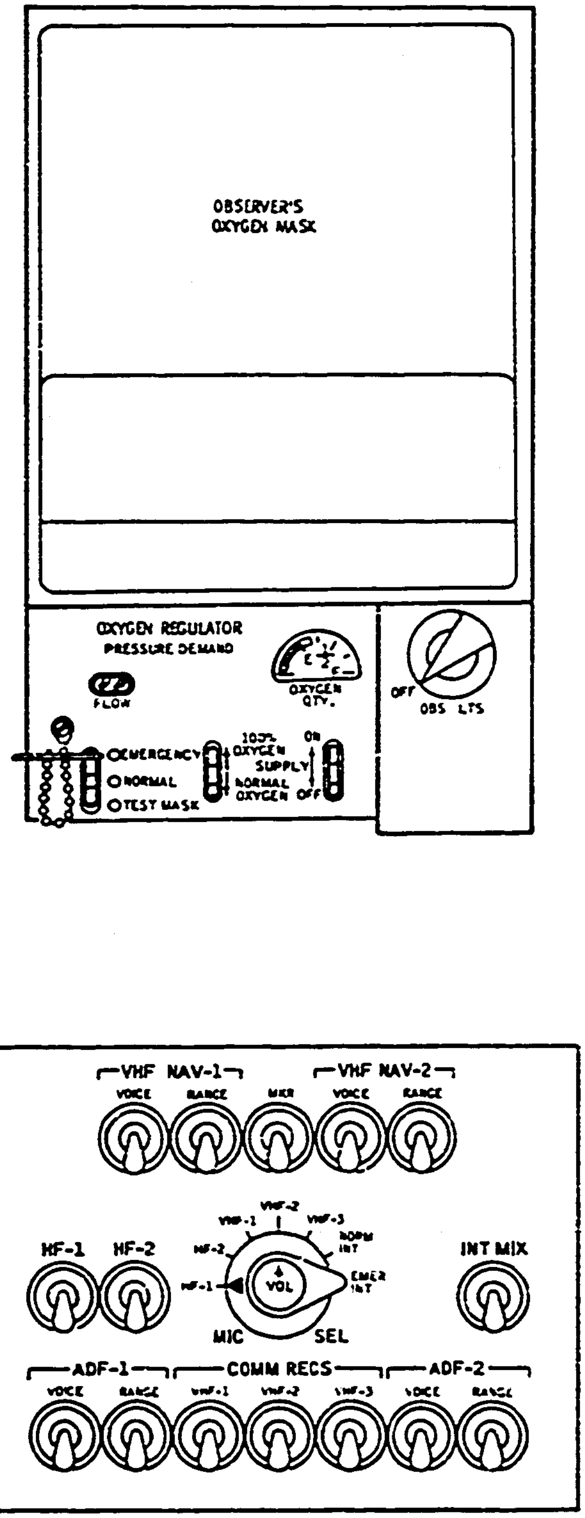
Navigator's/Observer's Instrument Panel
Figure 1



* INSTALLED ON N8077U AND N8099U

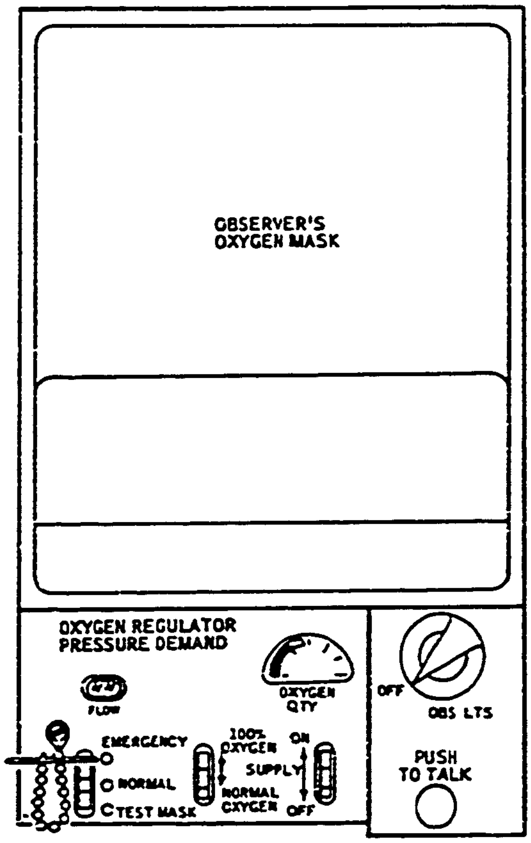
HA2-1261D

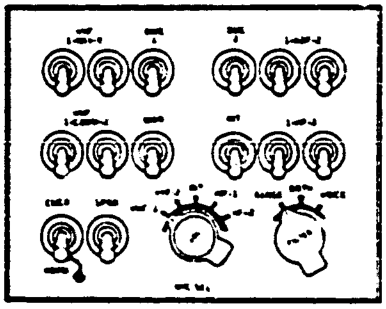
Navigator's/Observer's Instrument Panel
Figure 1



HA2-1332A

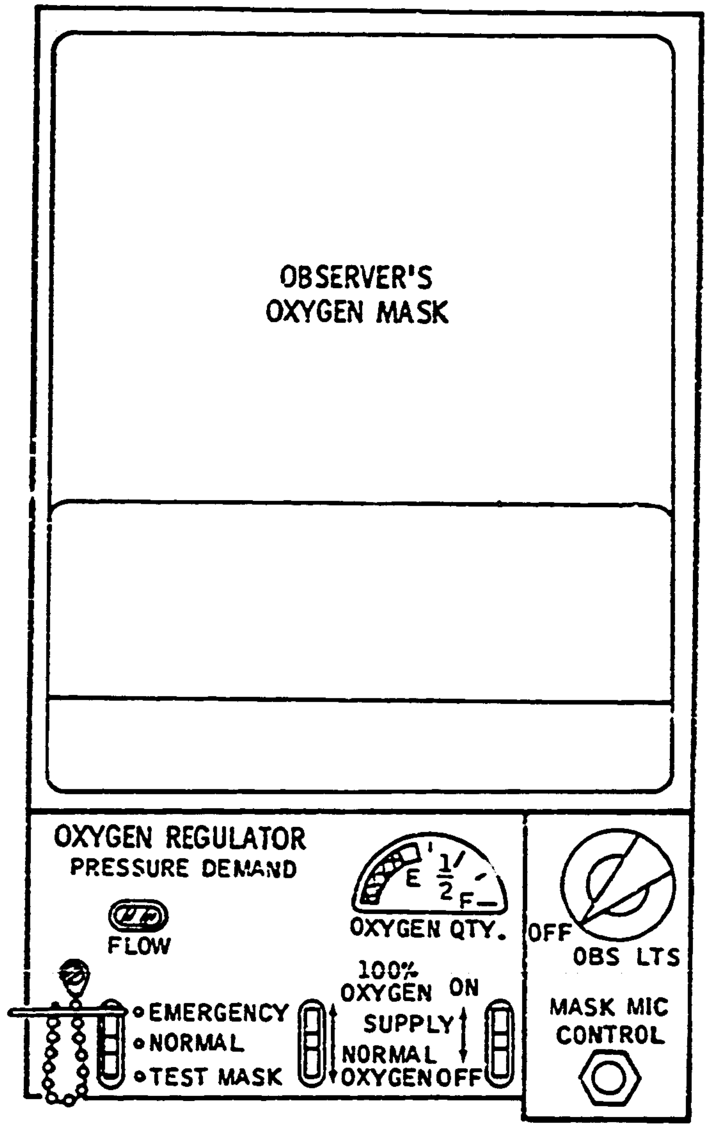
Navigator's/Observer's Instrument Panel
Figure 1





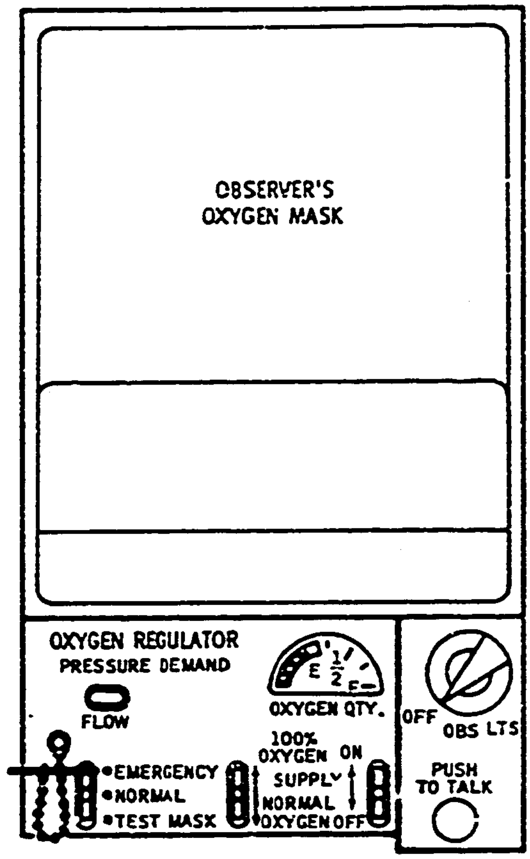
HA2-2365A

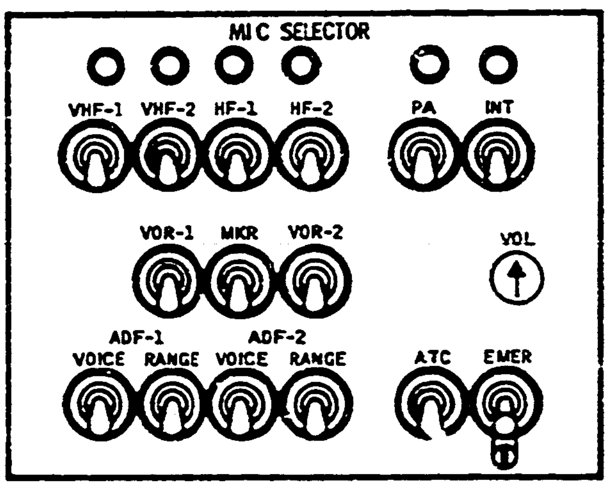
Navigator's/Observer's Instrument Panel
Figure 1



HA2-2976A

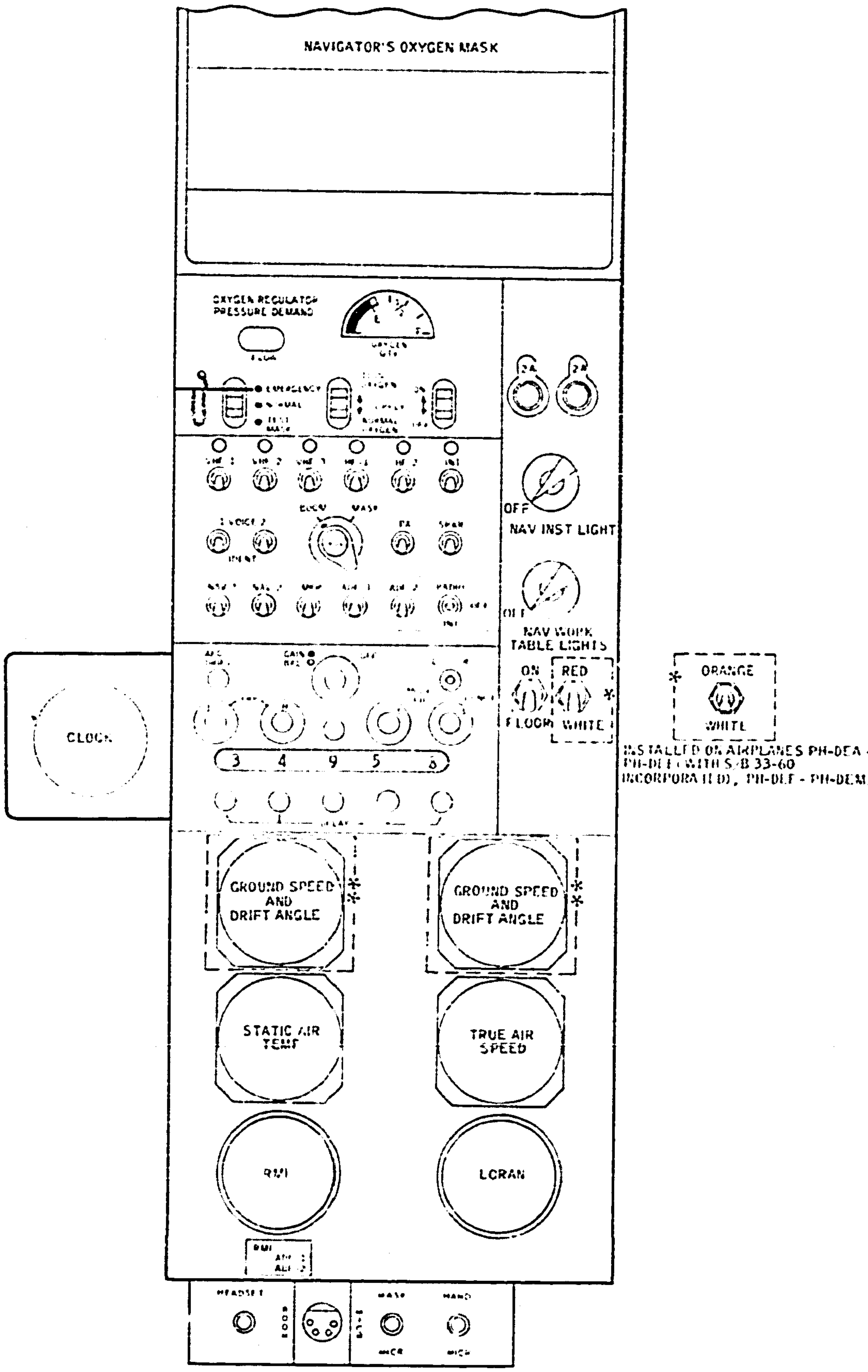
Navigator's/Observer's Instrument Panel
Figure 1



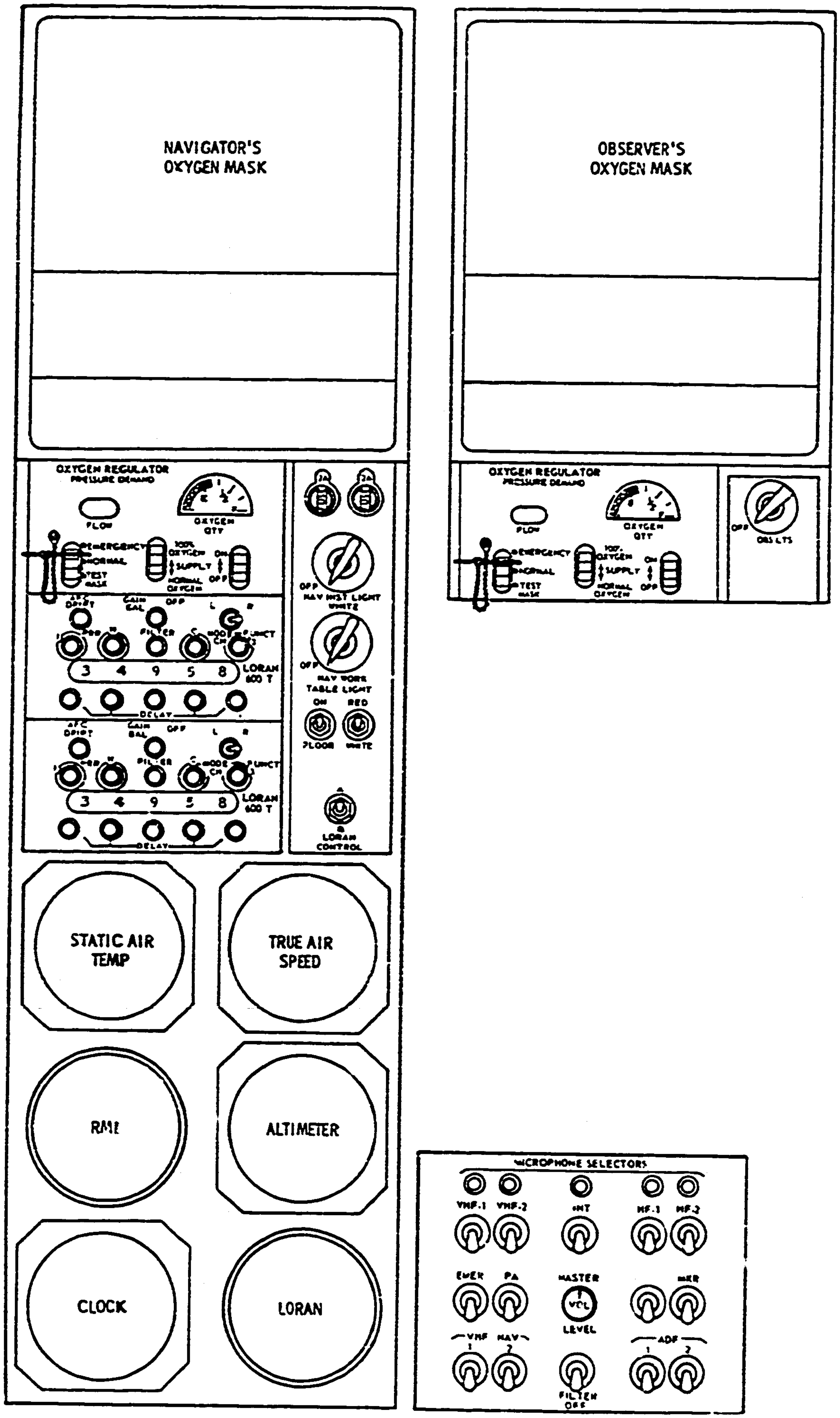


HA2-2977A

Navigator's/Observer's Instrument Panel
Figure 1



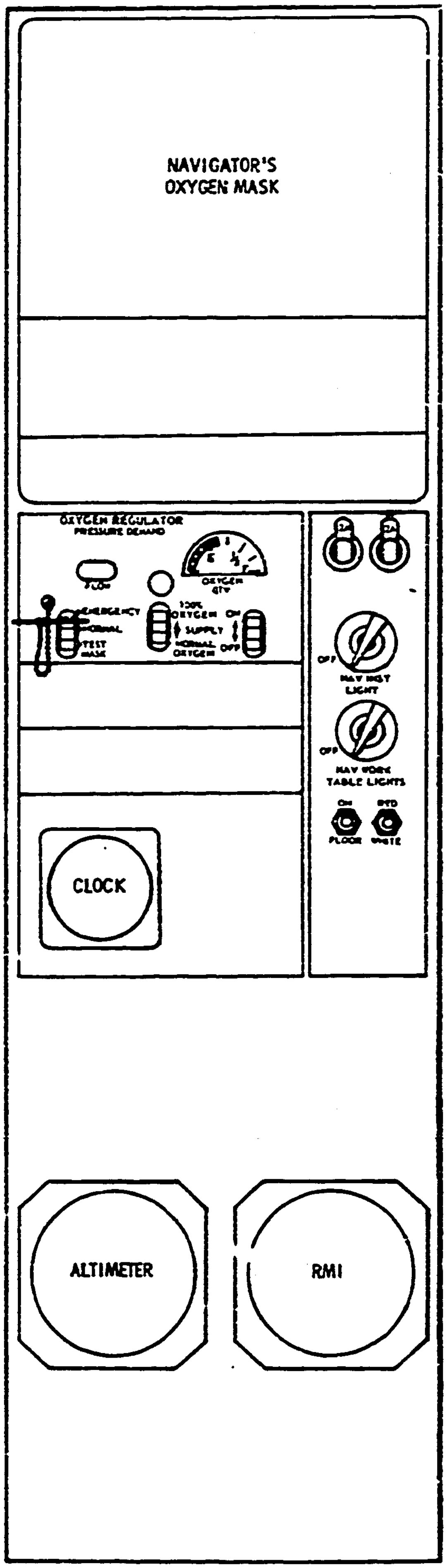
Navigator's/Observer's Instrument Panel
Figure 1

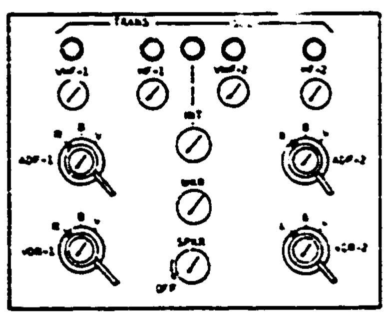


HA2-3590

Navigator's/Observer's Instrument Panel
Figure 1

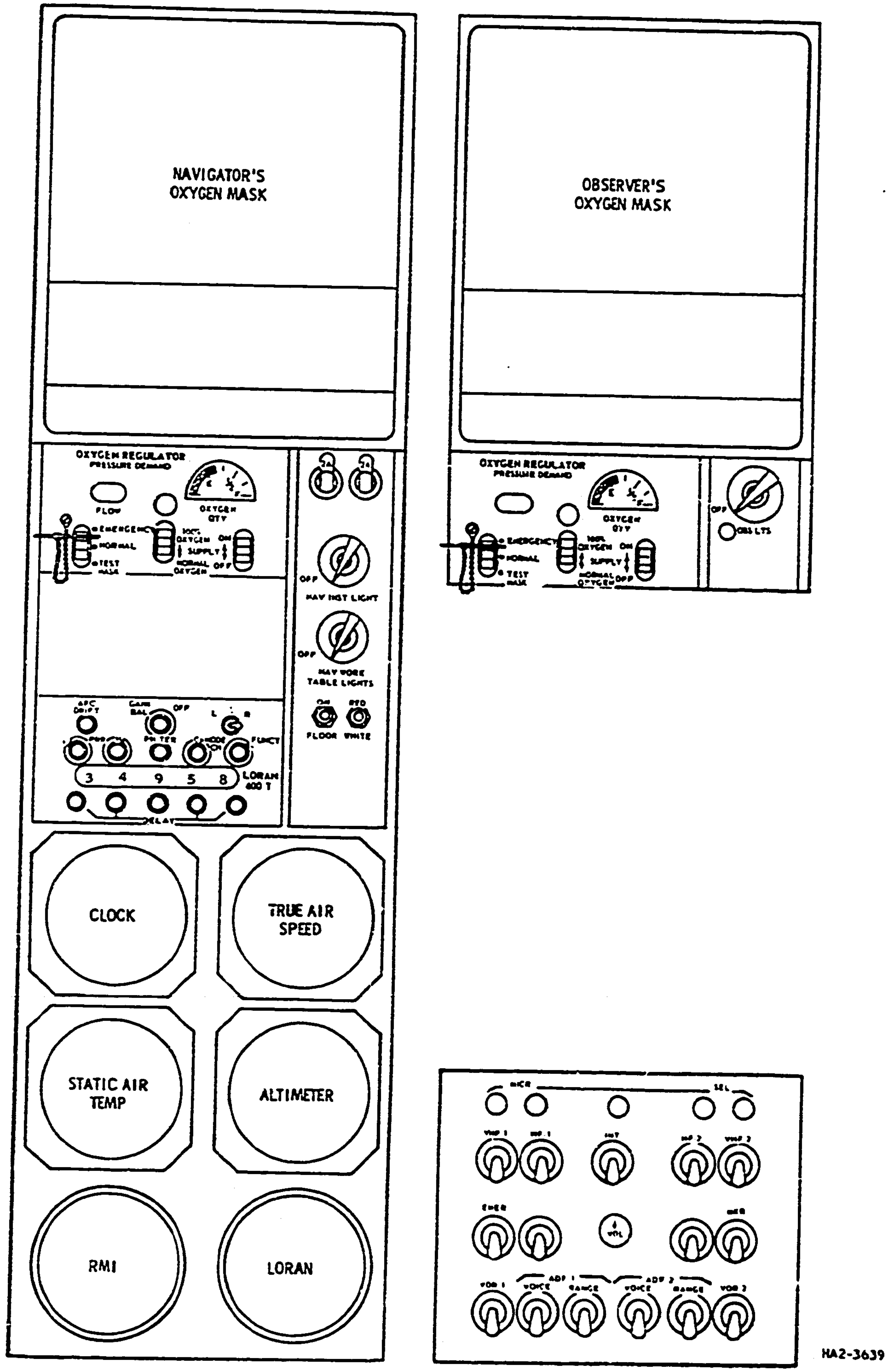
Printed in U.S.A.





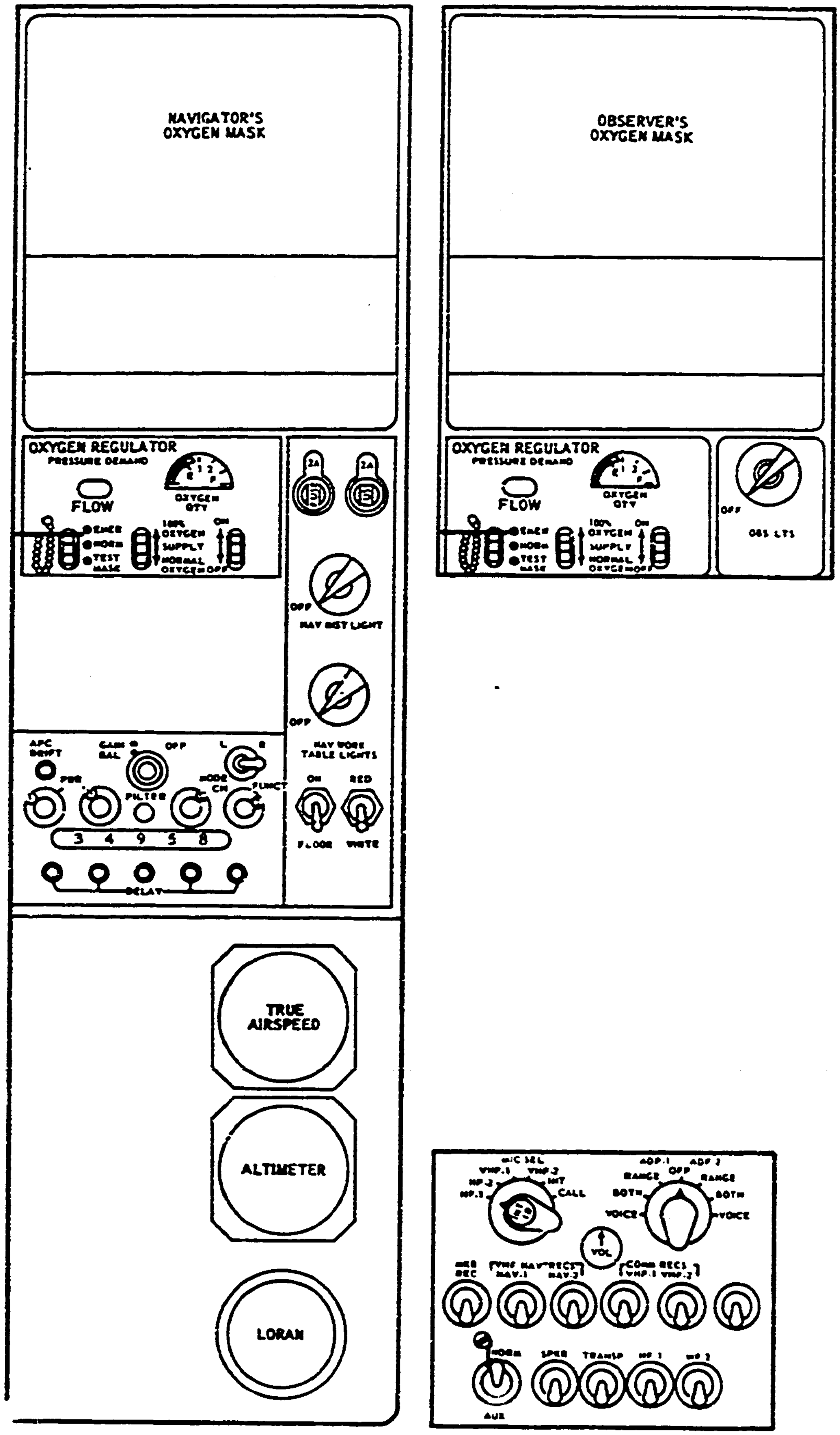
HA2-3606B

Navigator's/Observer's Instrument Panel
Figure 1



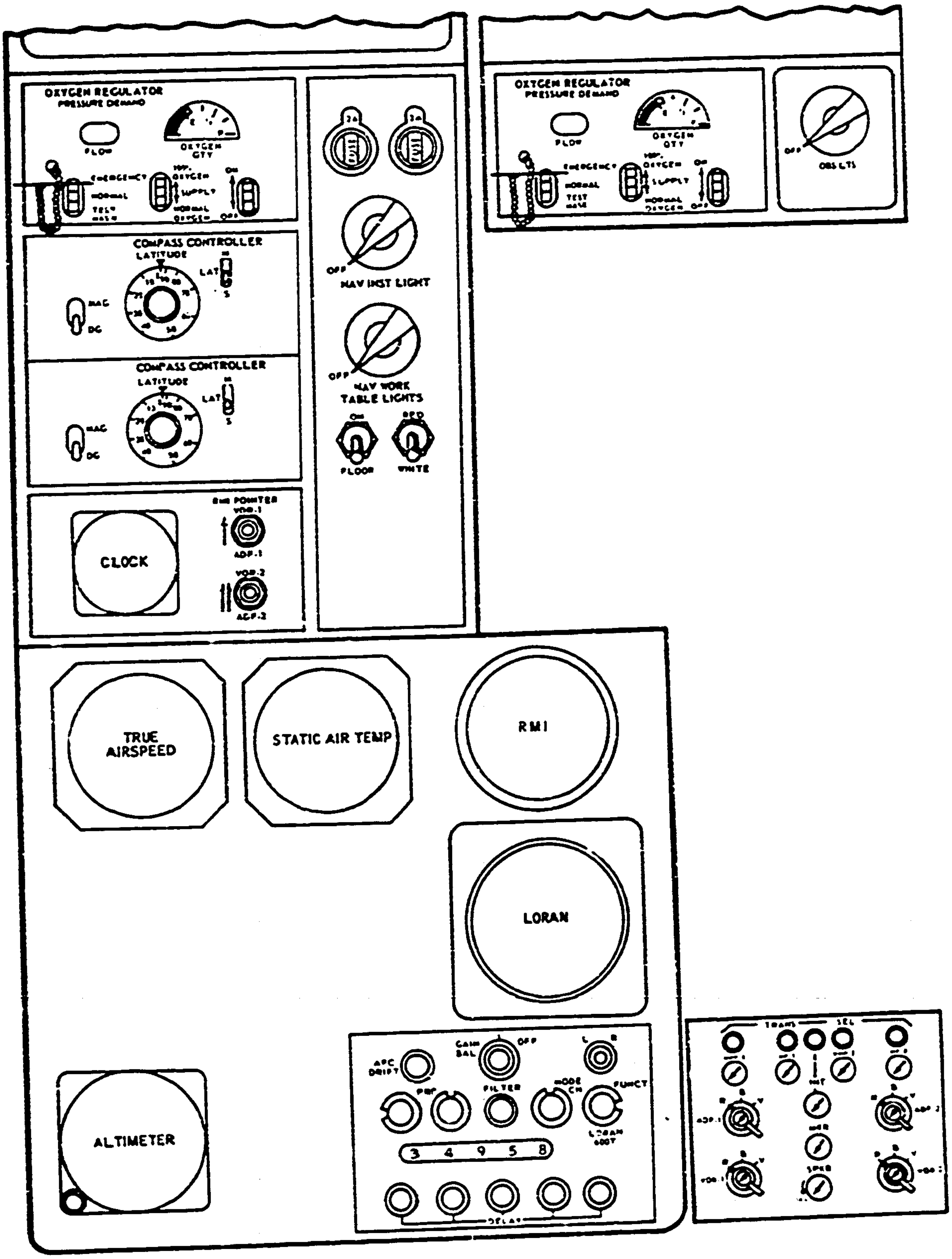
Navigator's/Observer's Instrument Panel
Figure 1

Printed in U.S.A.

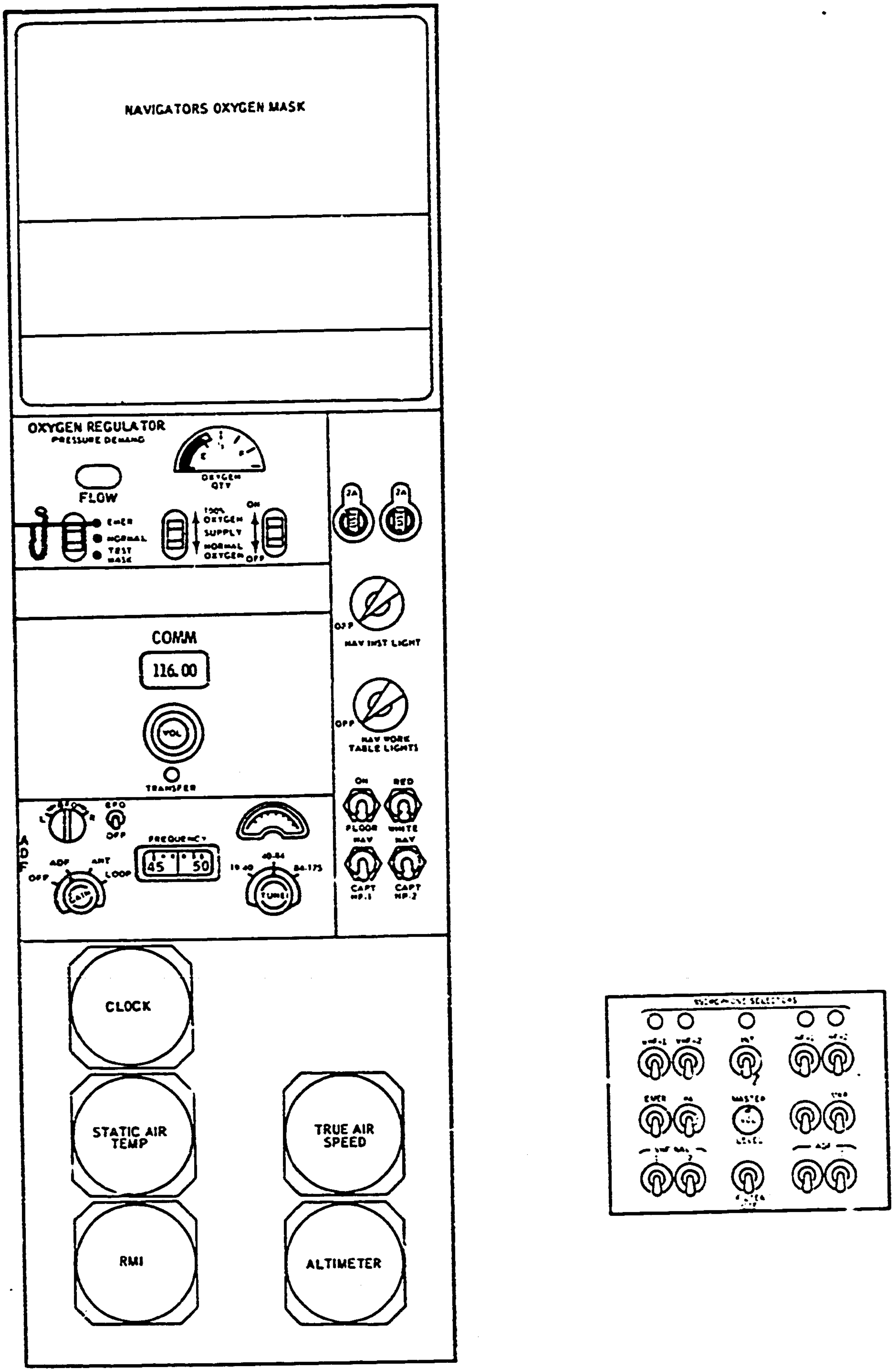


HA2-3690A

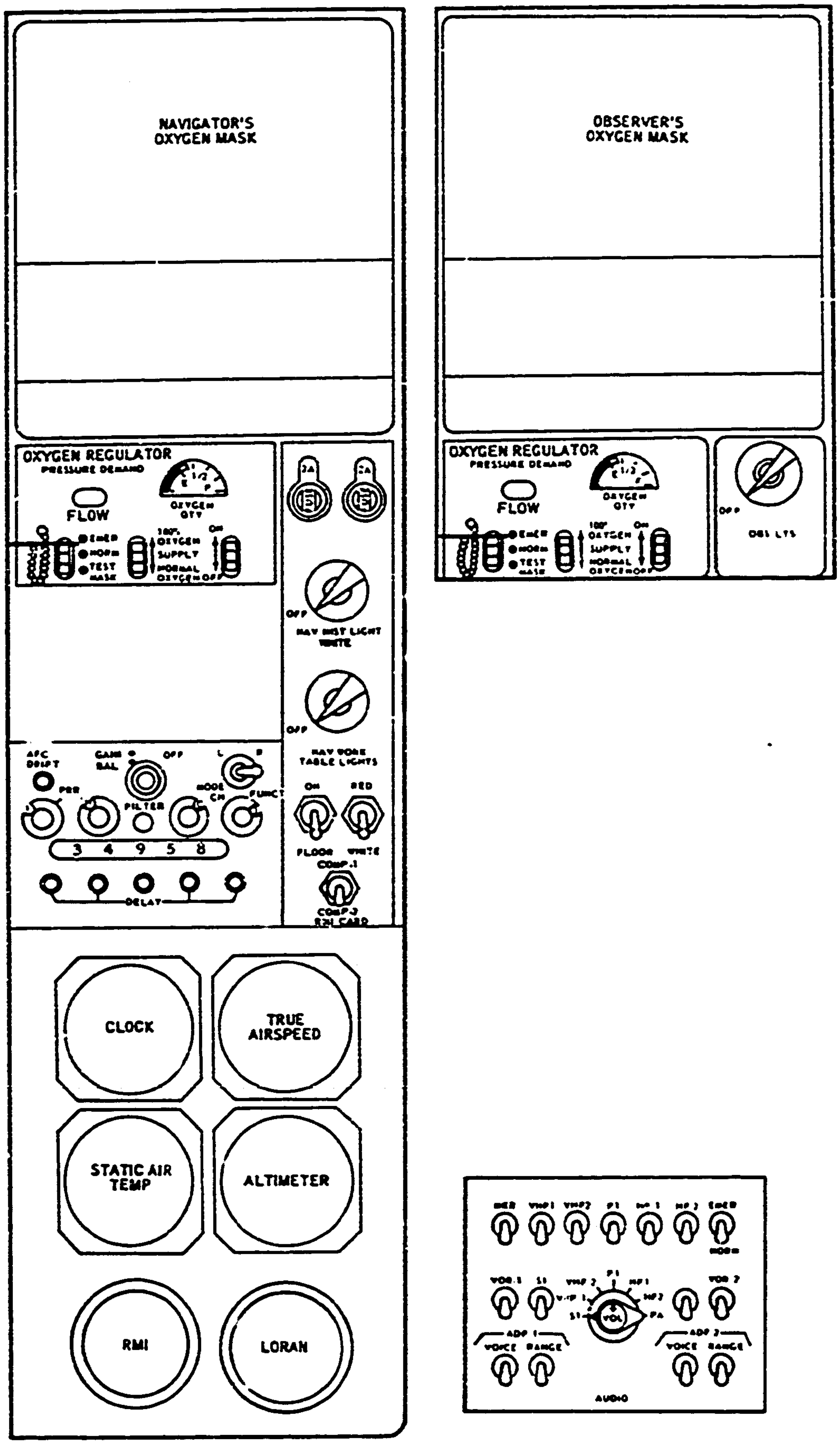
Navigator's/Observer's Instrument Panel
Figure 1



Navigator's/Observer's Instrument Panel
Figure 1

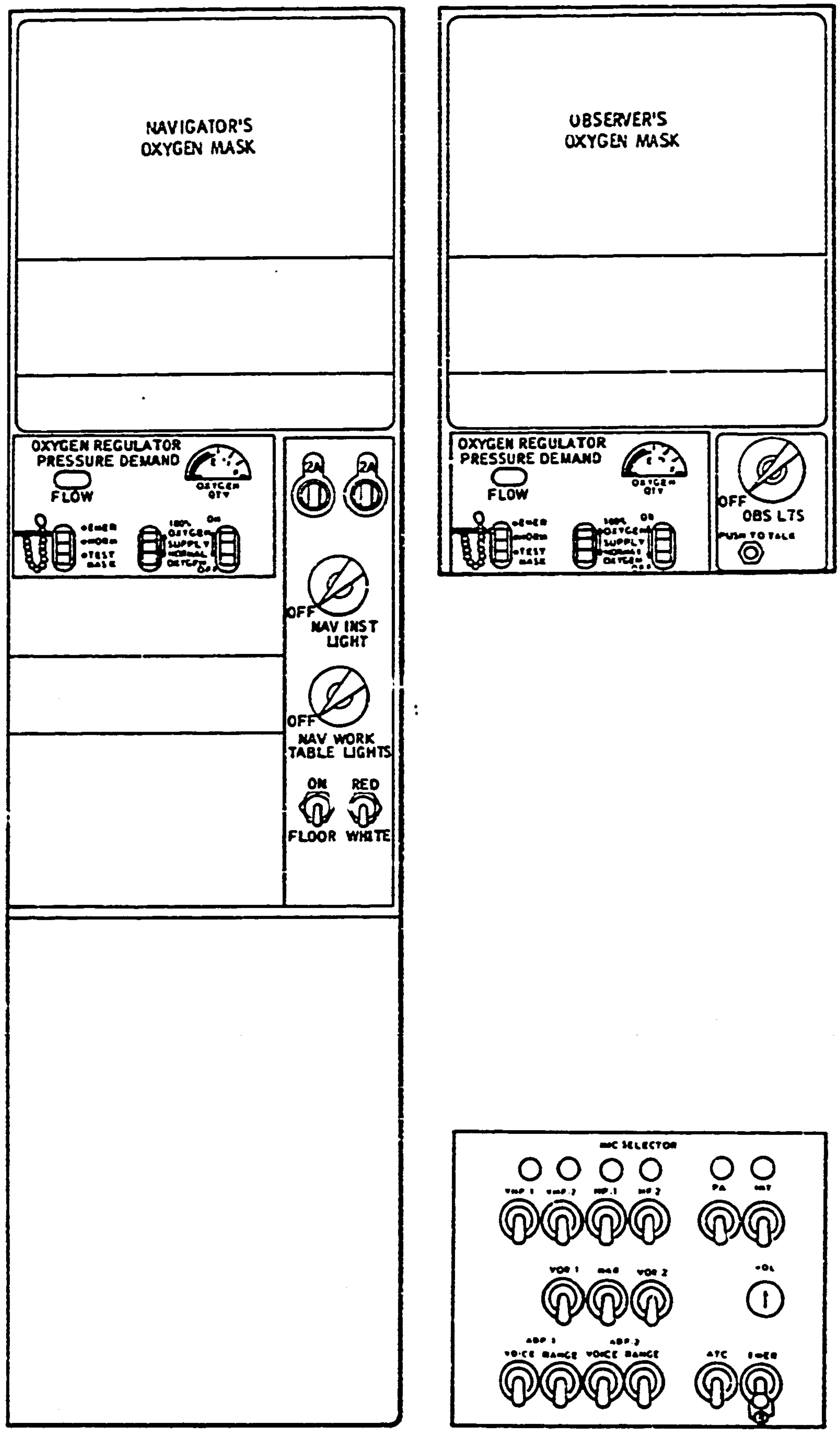


Navigator's/Observer's Instrument Panel
Figure 1



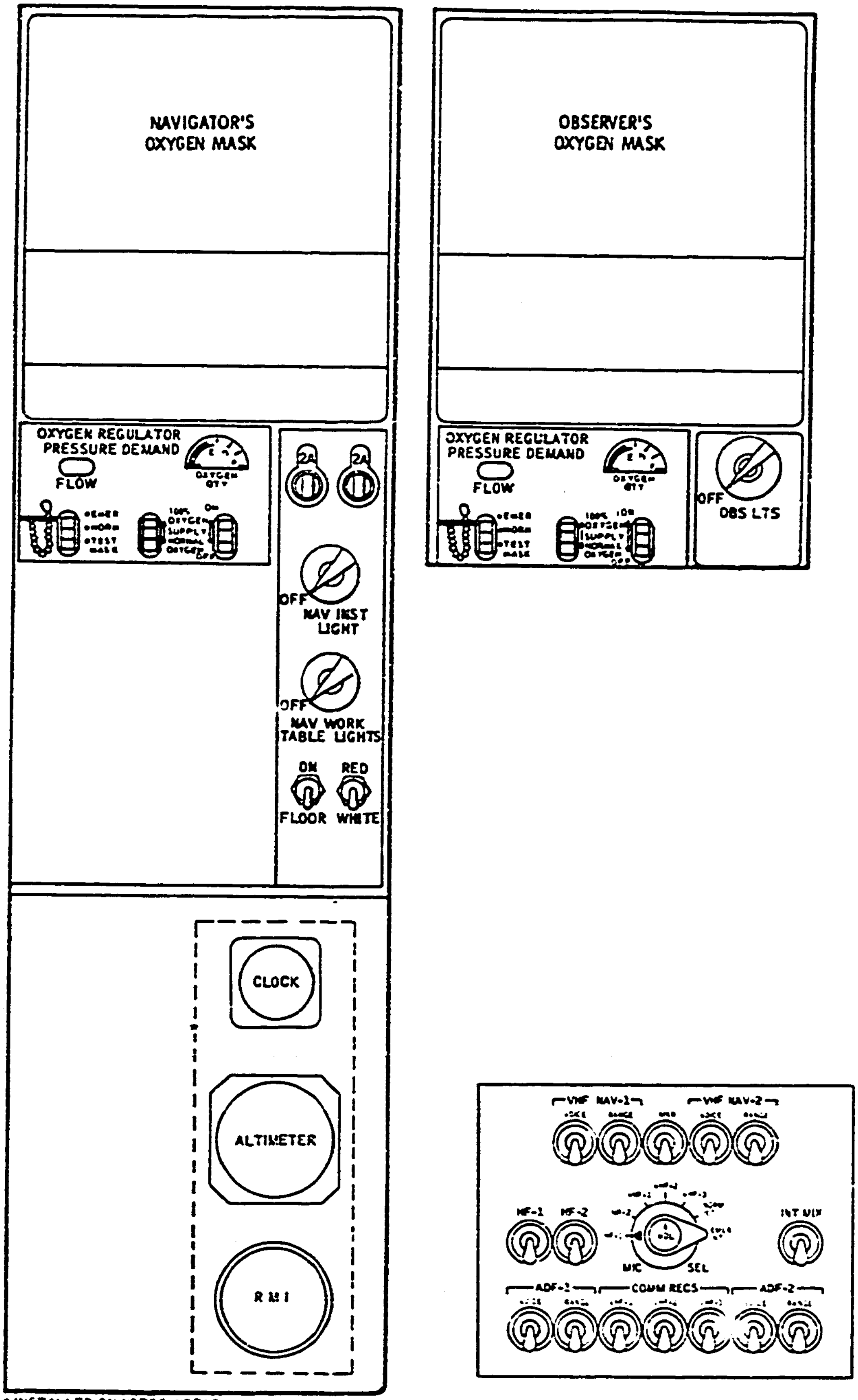
HA2-4221

Navigator's/Observer's Instrument Panel
Figure 1



HA2-4225A

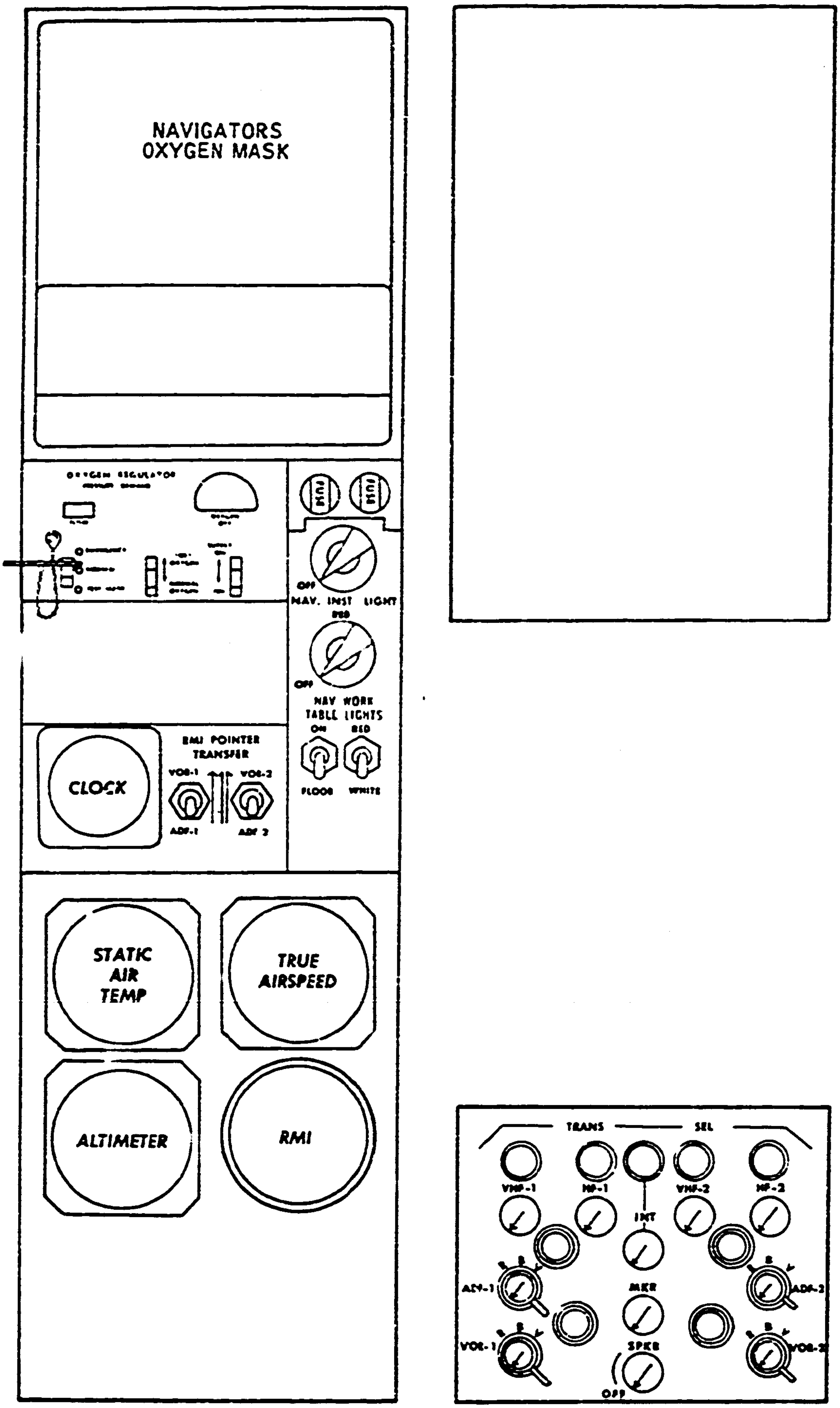
Navigator's/Observer's Instrument Panel
Figure 1



*INSTALLED ON N8755-N8760

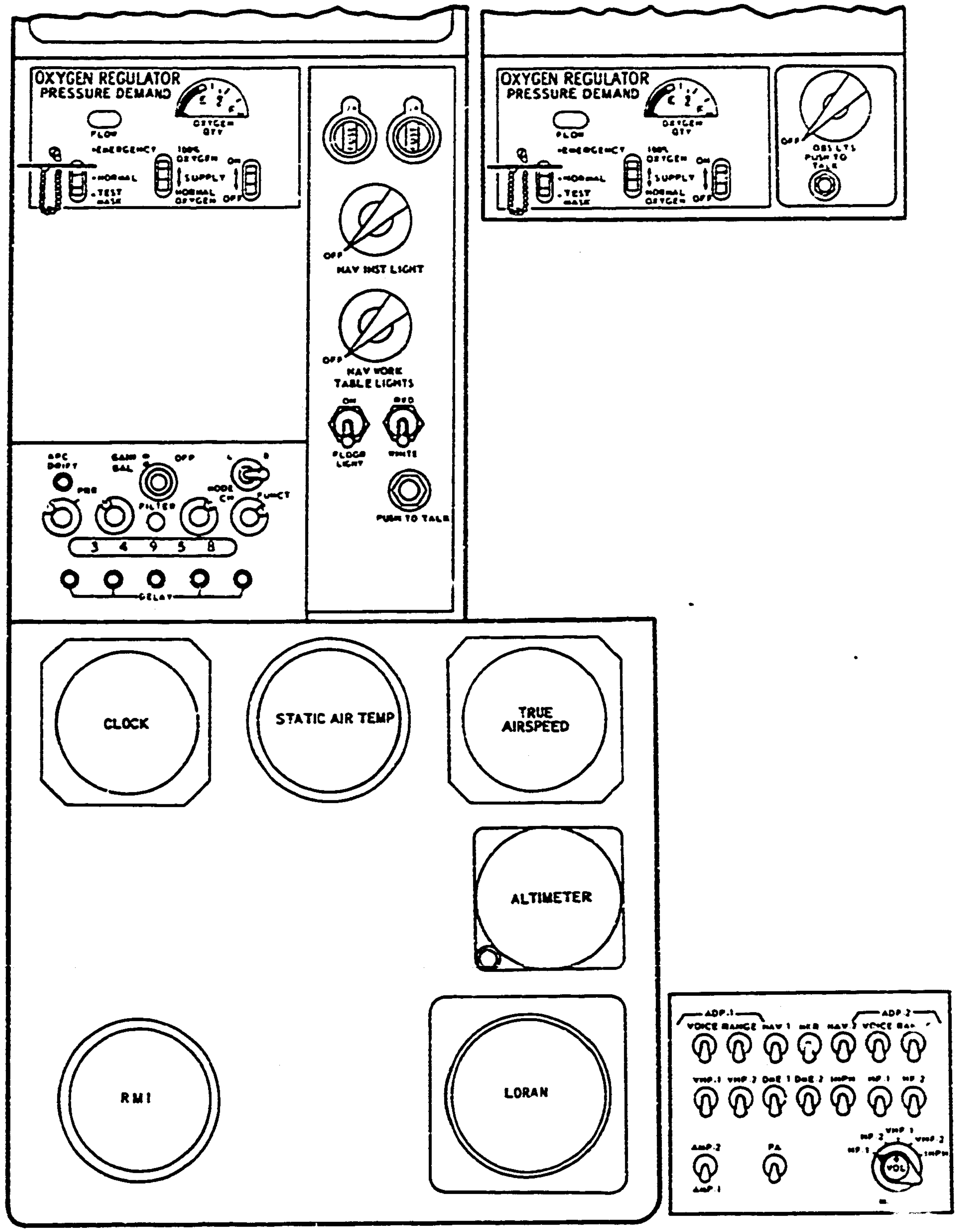
HA2-4433C

Navigator's/Observer's Instrument Panel
Figure 1



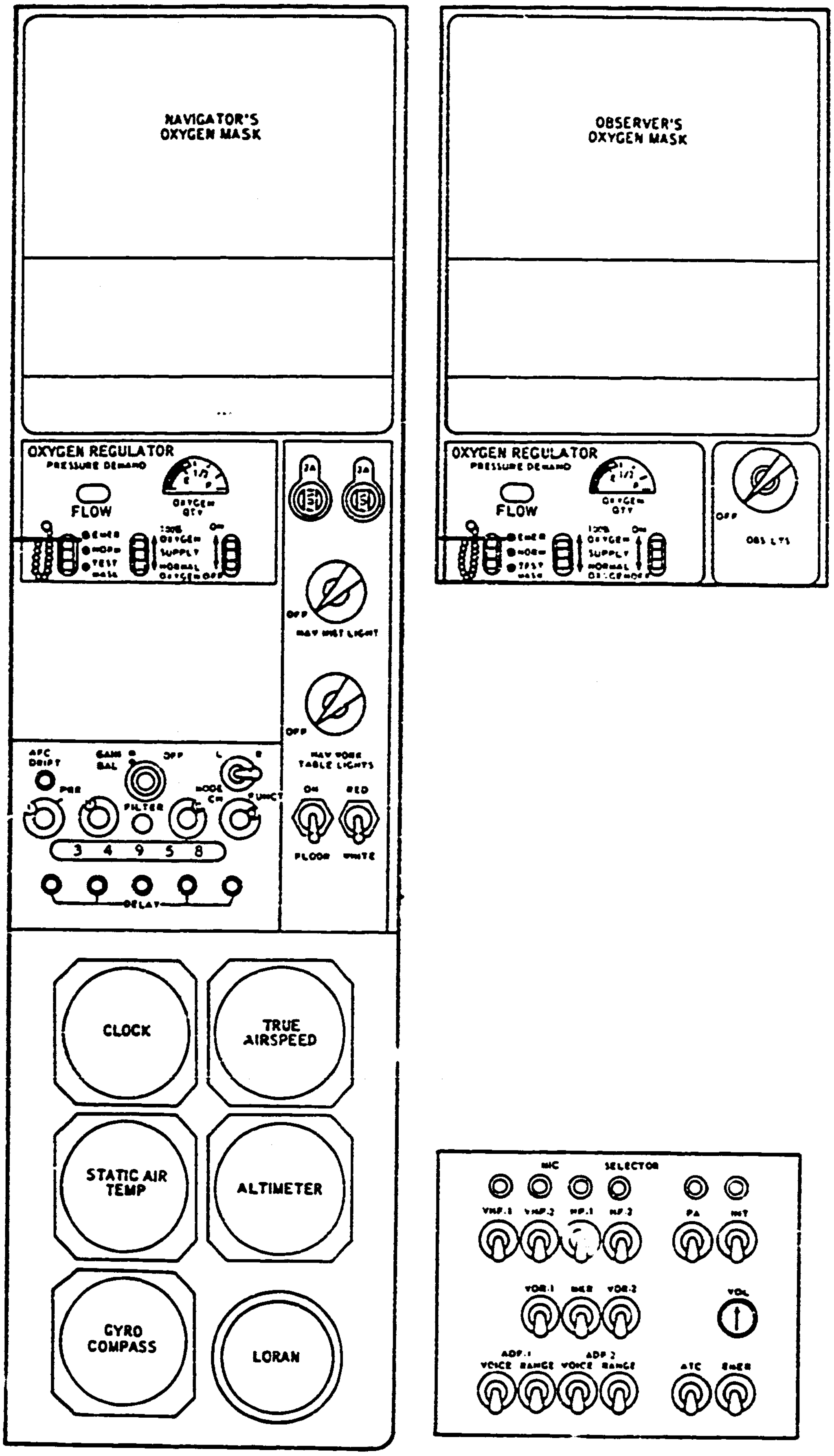
H1-192

Navigator's/Observer's Instrument Panel
Figure 1



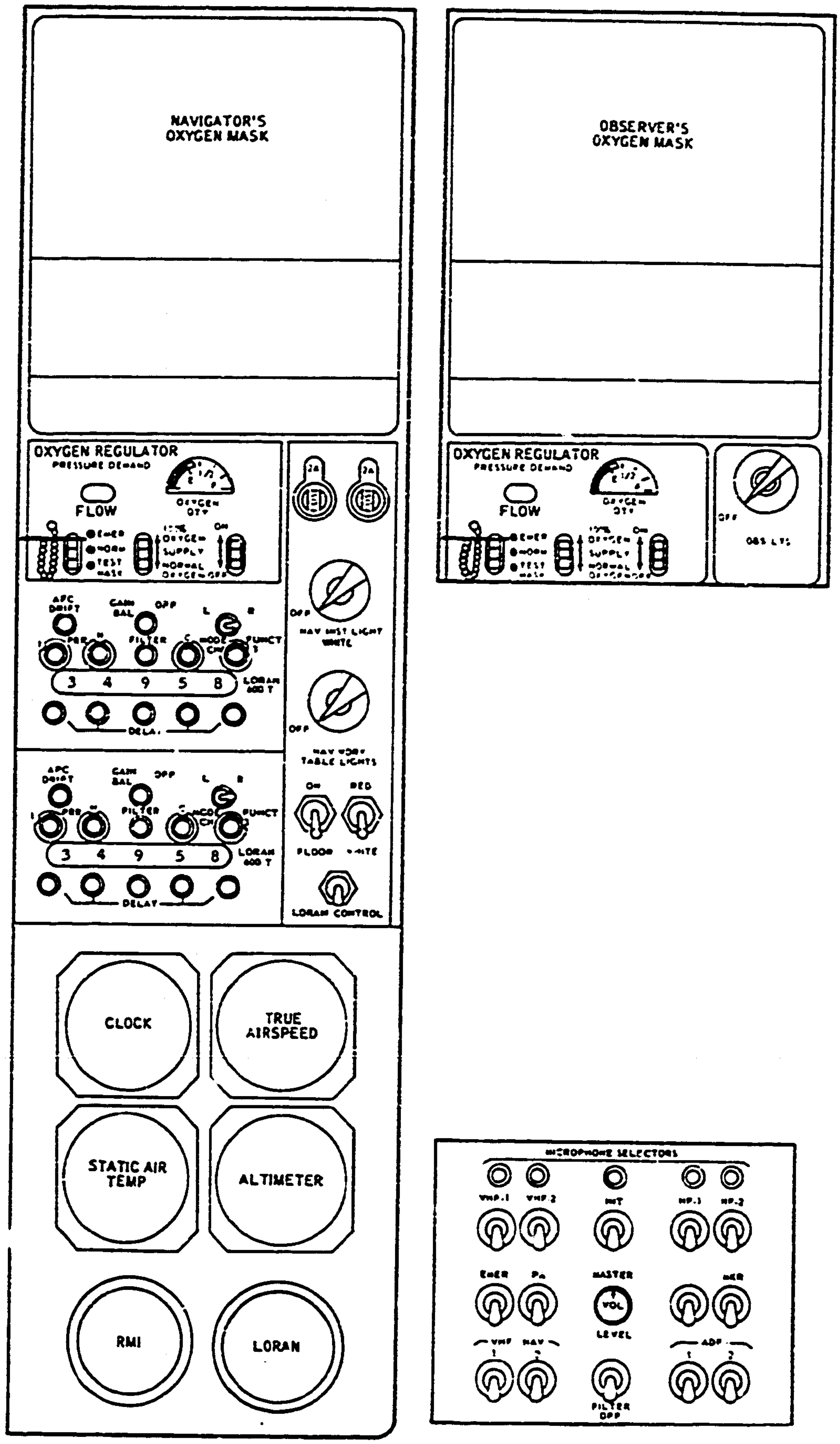
HA2-4847A

Navigator's/Observer's Instrument Panel
Figure 1



HA2-4845

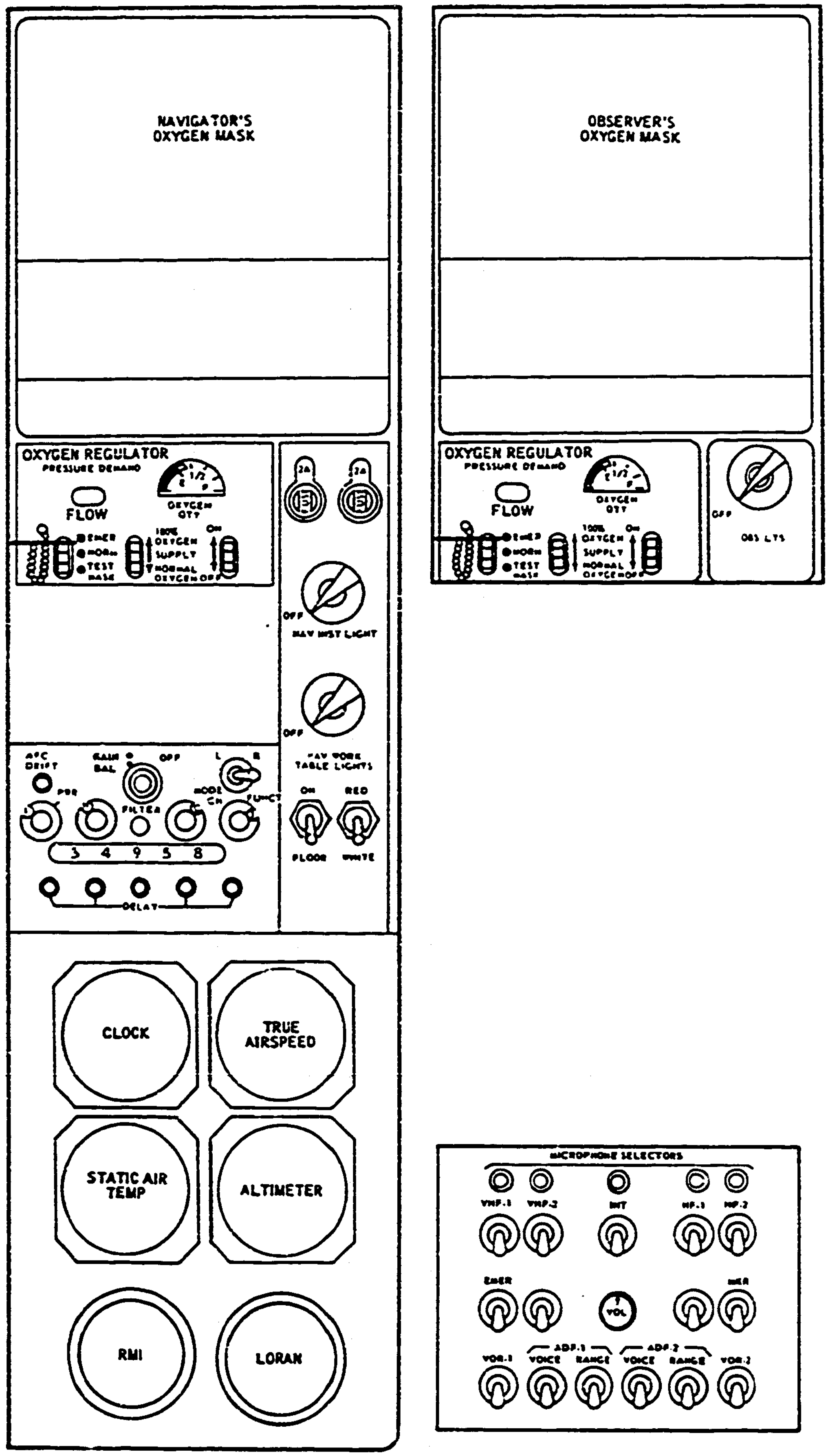
Navigator's/Observer's Instrument Panel
Figure 1



HA2-4846

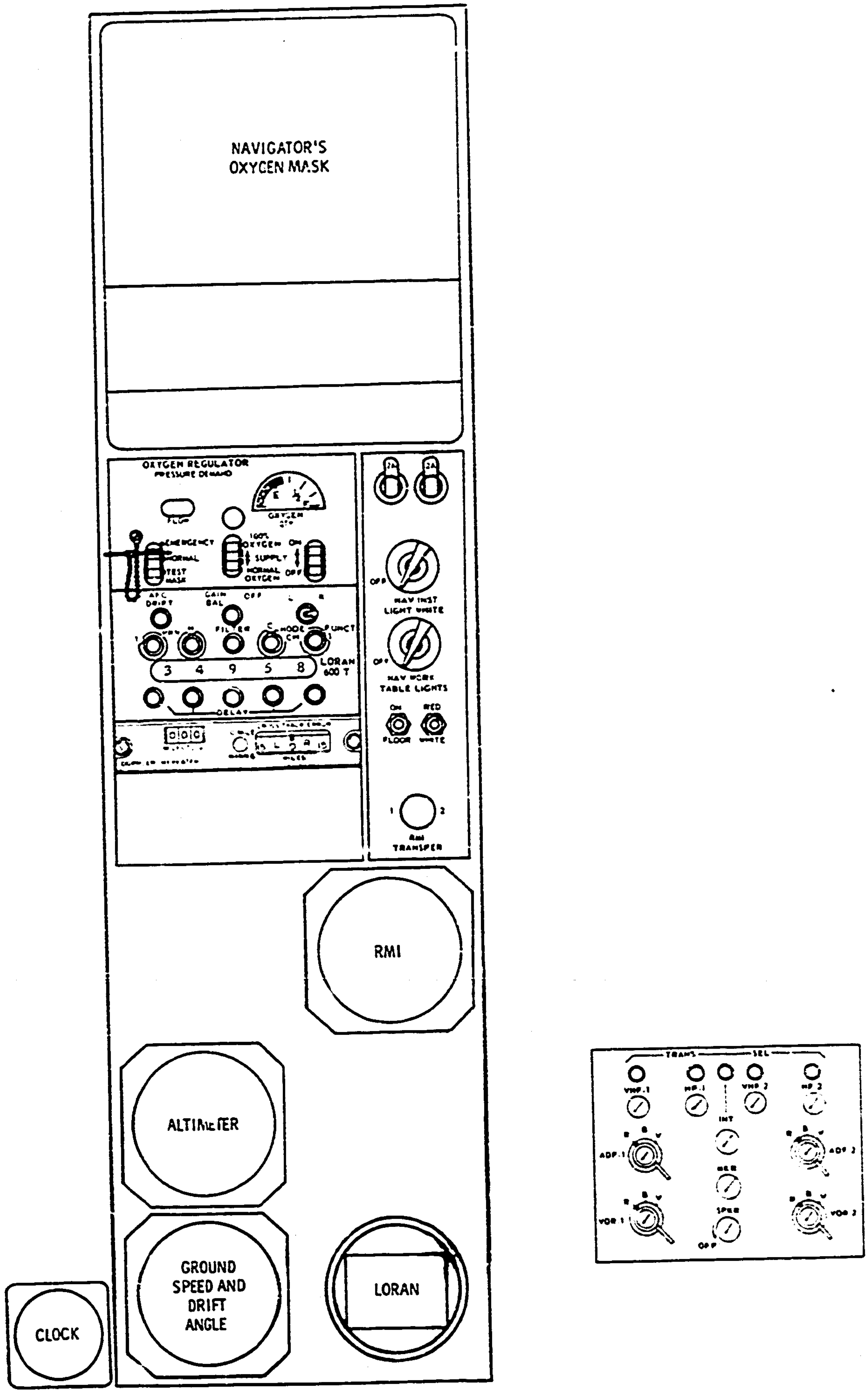
Navigator's/Observer's Instrument Panel

Figure 1



HA2-4838

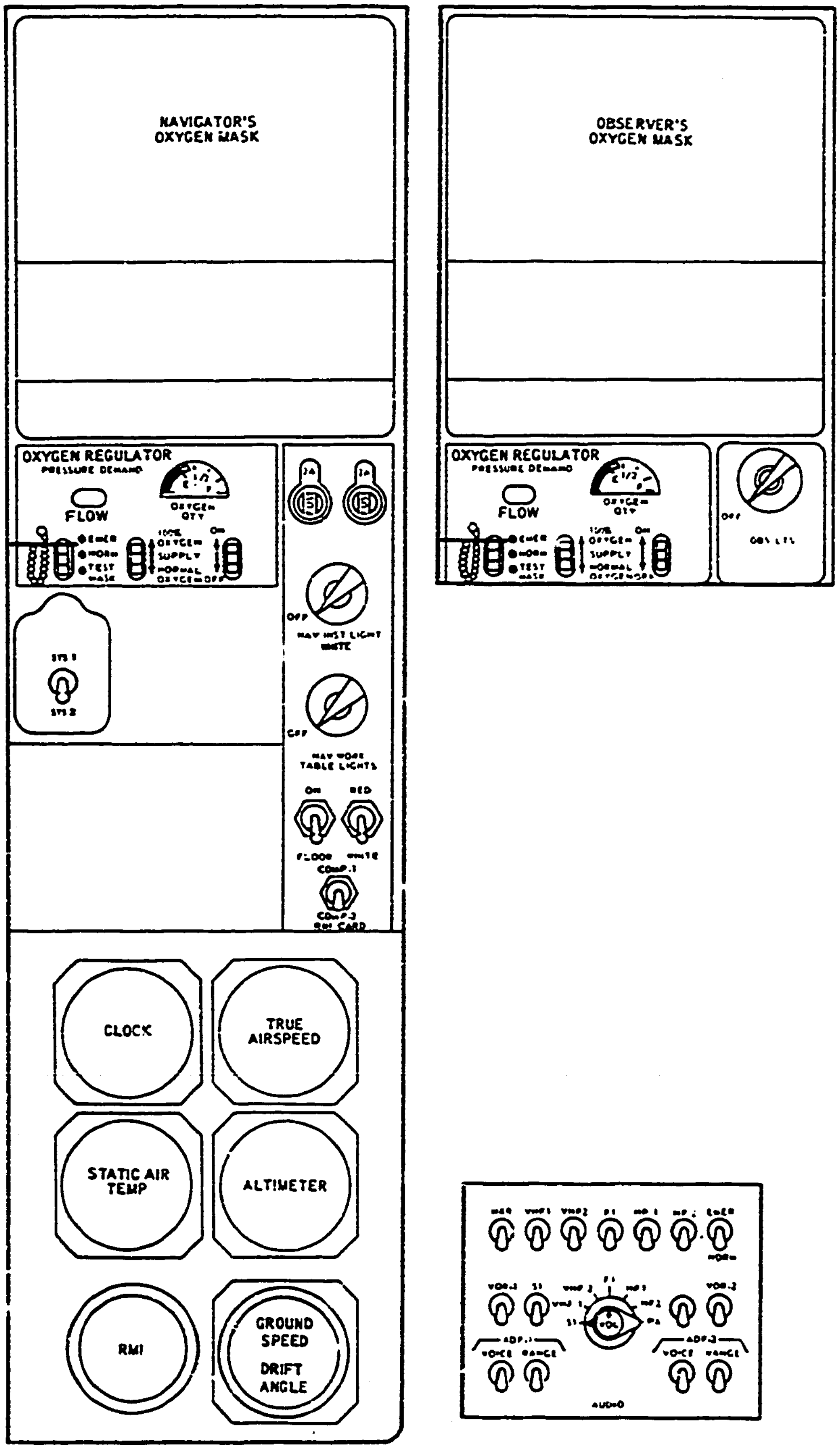
Navigator's/Observer's Instrument Panel
Figure 1



HA2-5480A

Navigator's/Observer's Instrument Panel
Figure 1

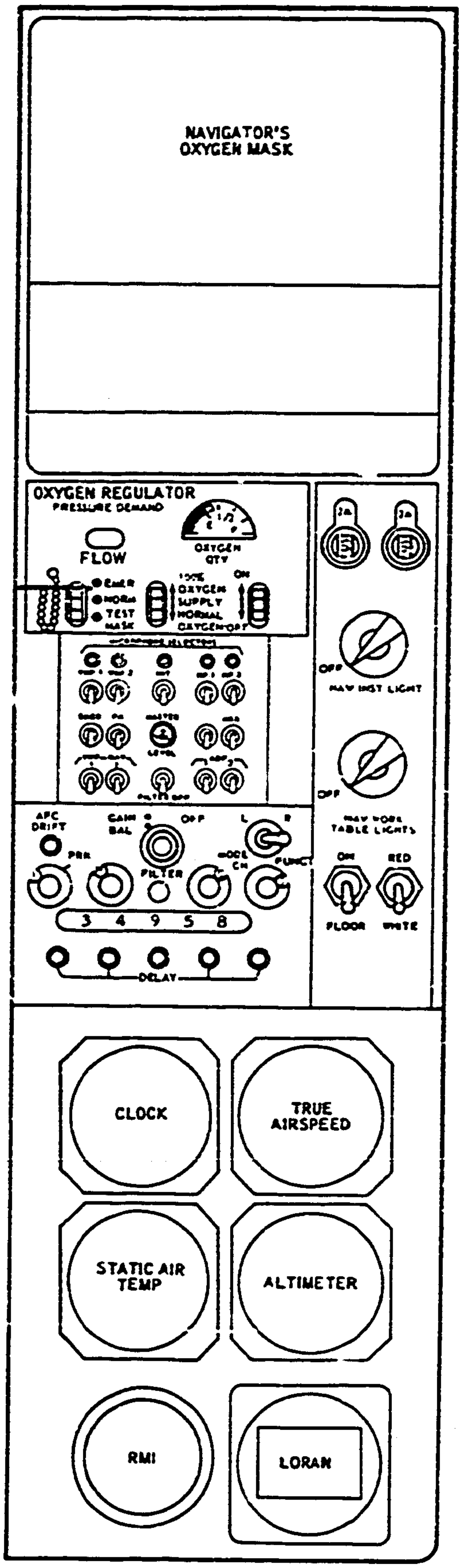
Printed in U.S.A.



HA2-5482

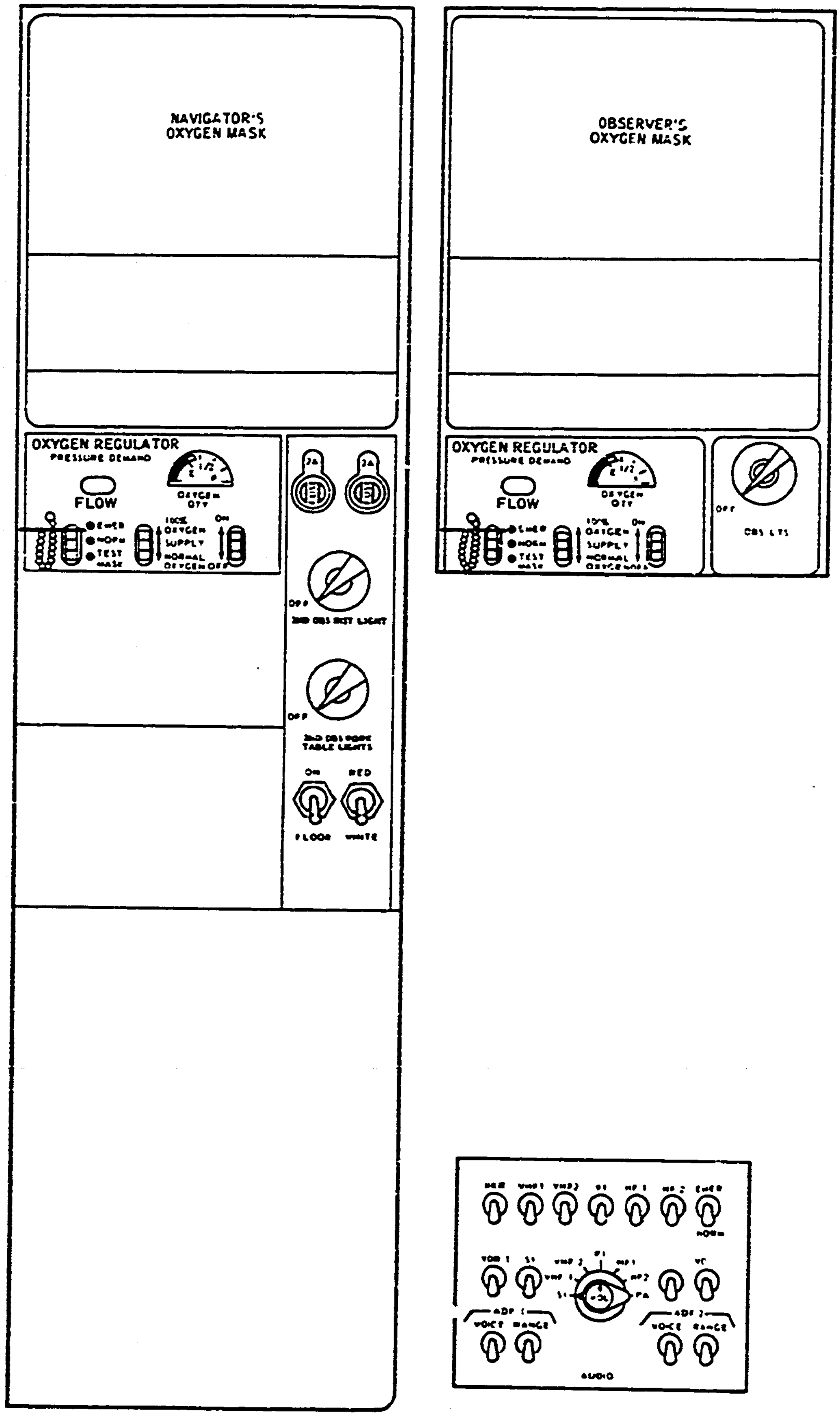
Navigator's/Observer's Instrument Panel
Figure 1

Printed in U.S.A.



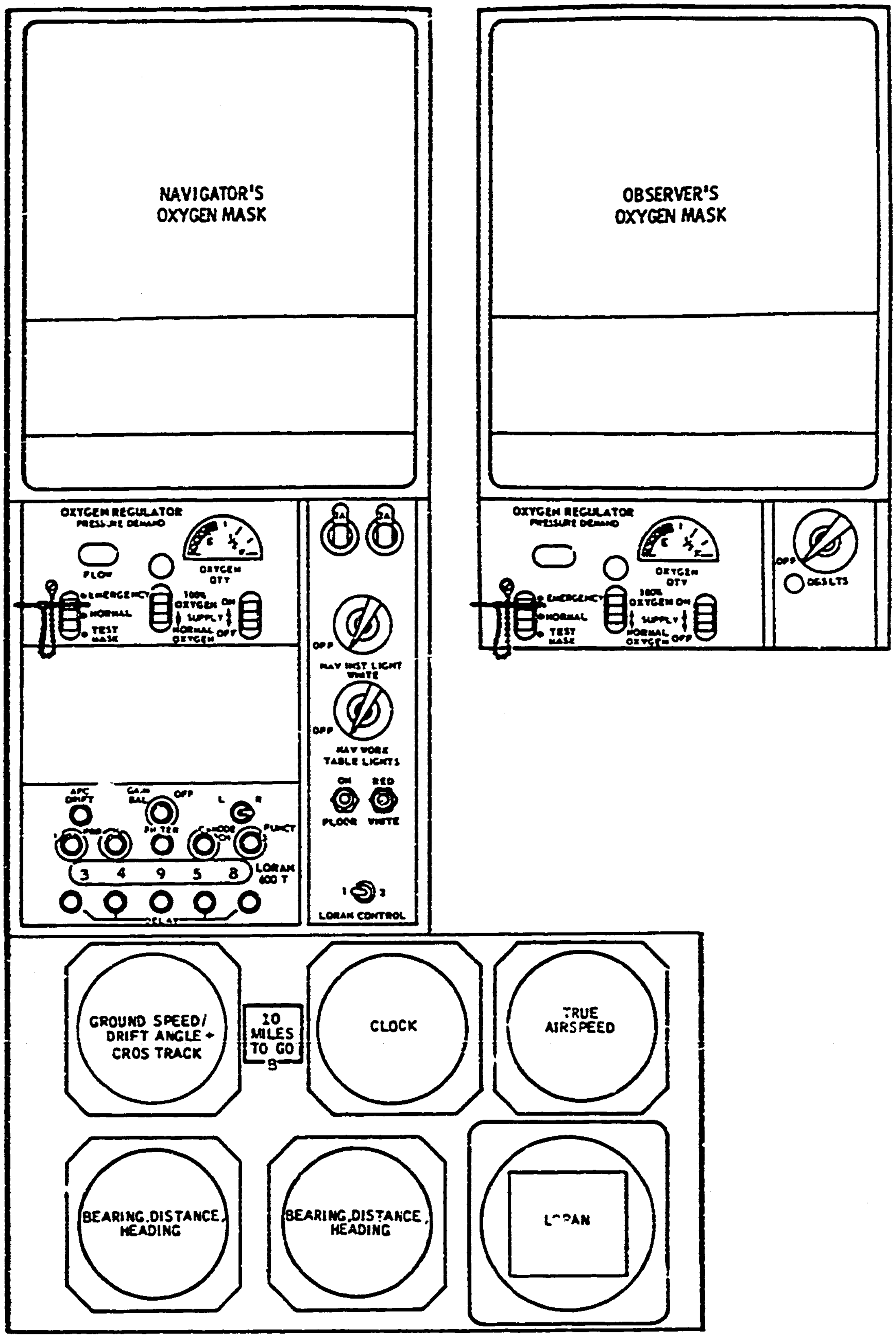
HA2-5615

Navigator's/Observer's Instrument Panel
Figure 1



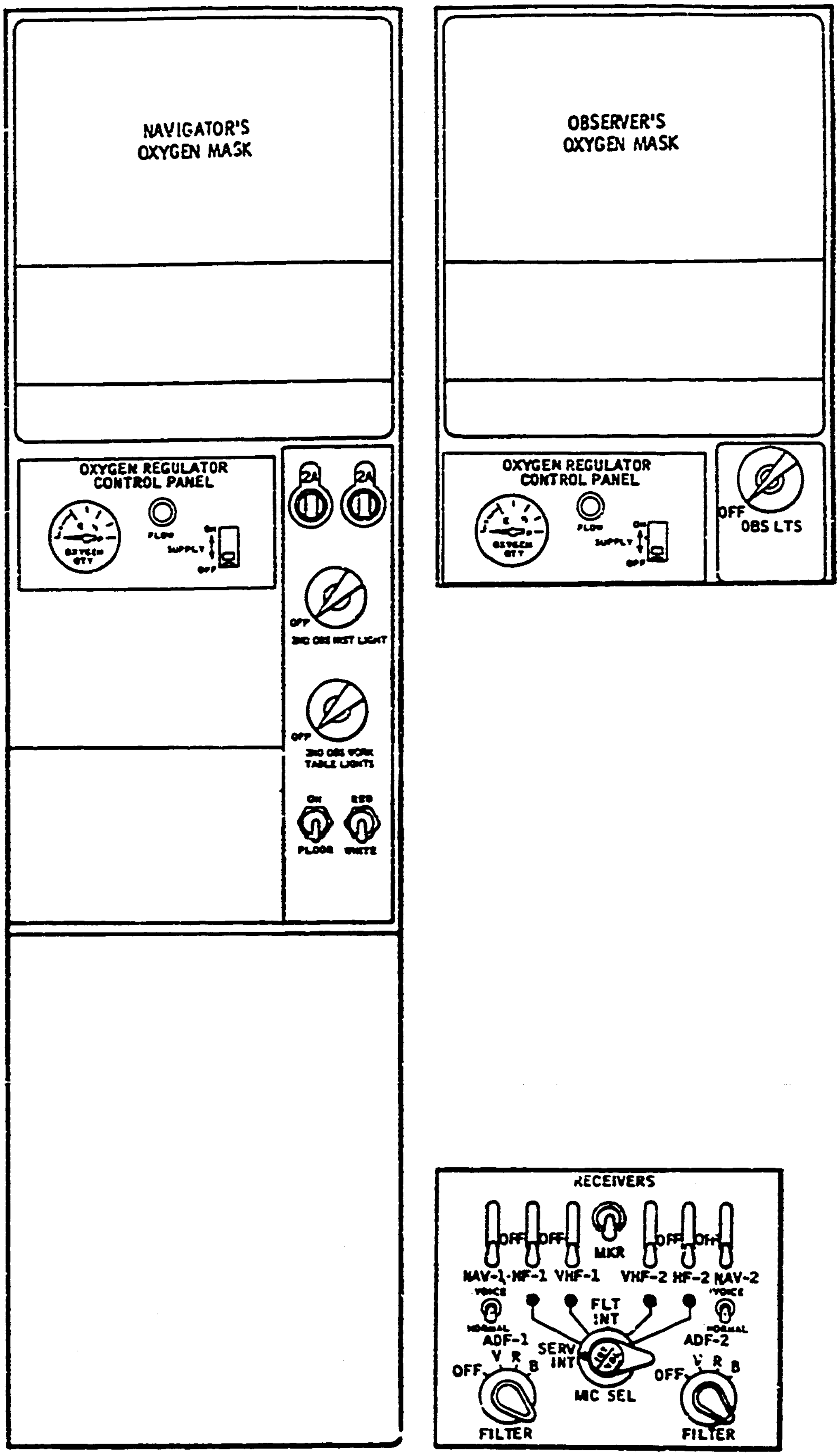
HA2-5769

Navigator's/Observer's Instrument Panel
Figure 1



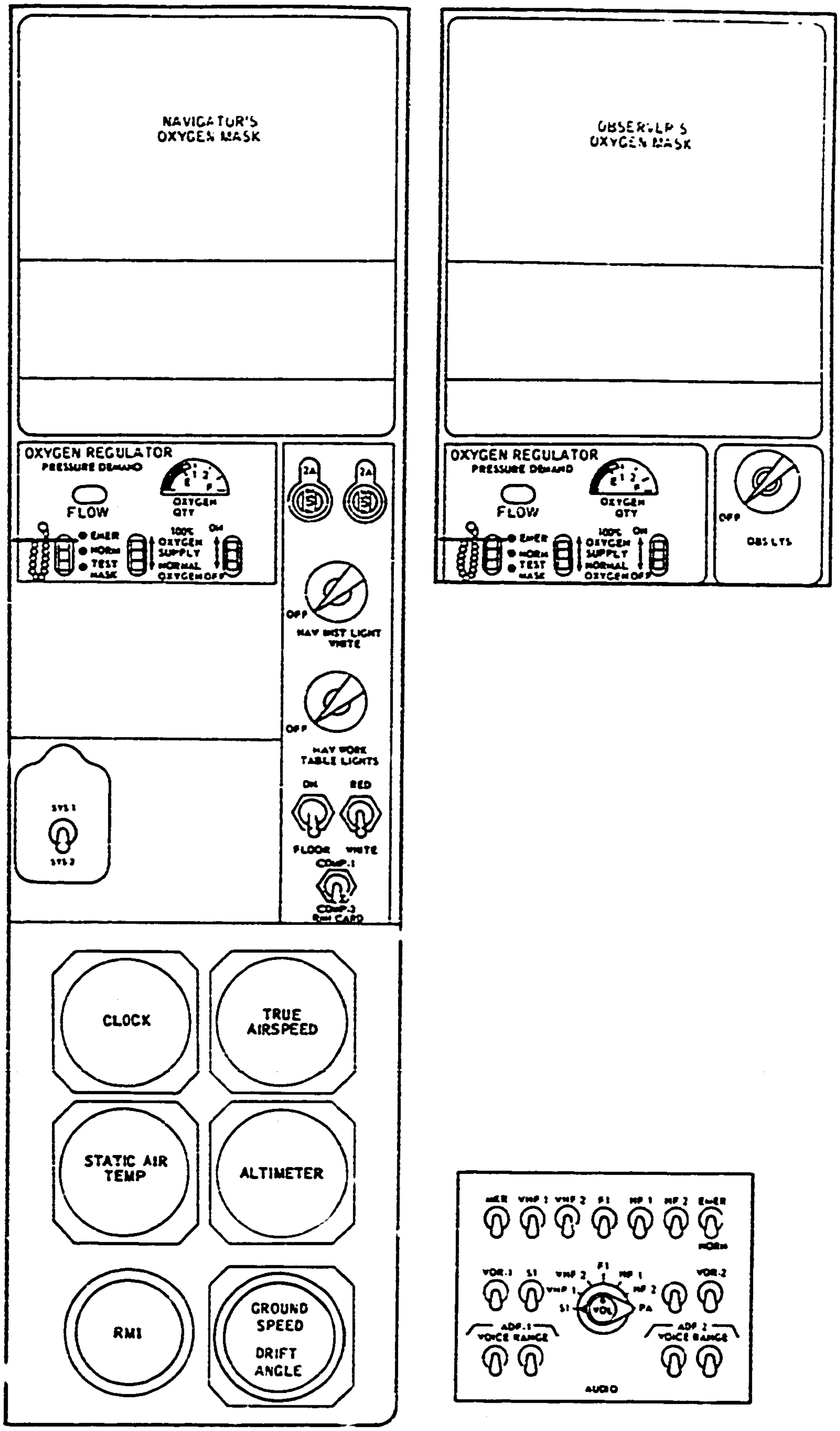
HA2-5777

Navigator's/Observer's Instrument Panel
Figure 1



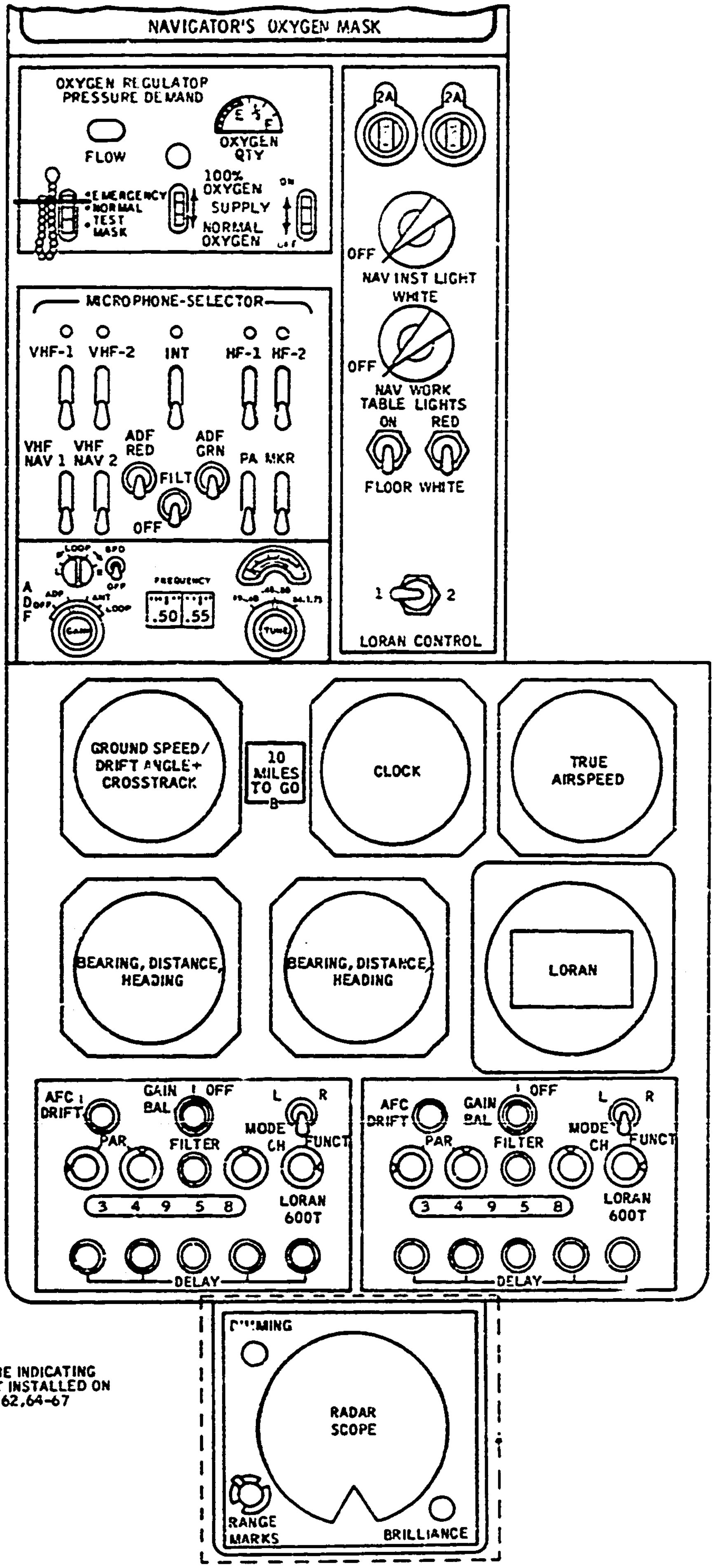
HA2-6055

Navigator's/Observer's Instrument Panel
Figure 1



HA2-6402

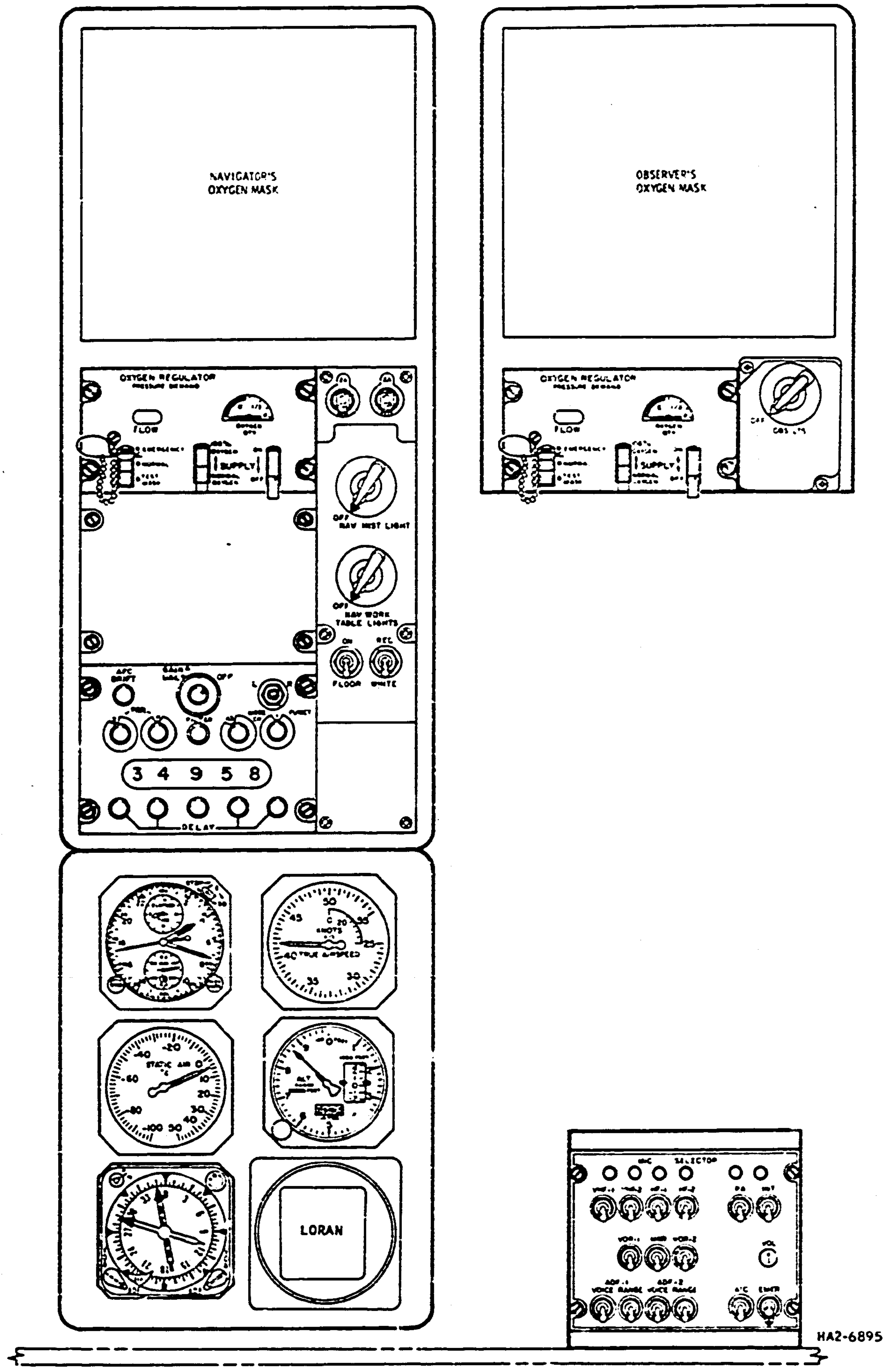
Navigator's/Observer's Instrument Panel
Figure 1



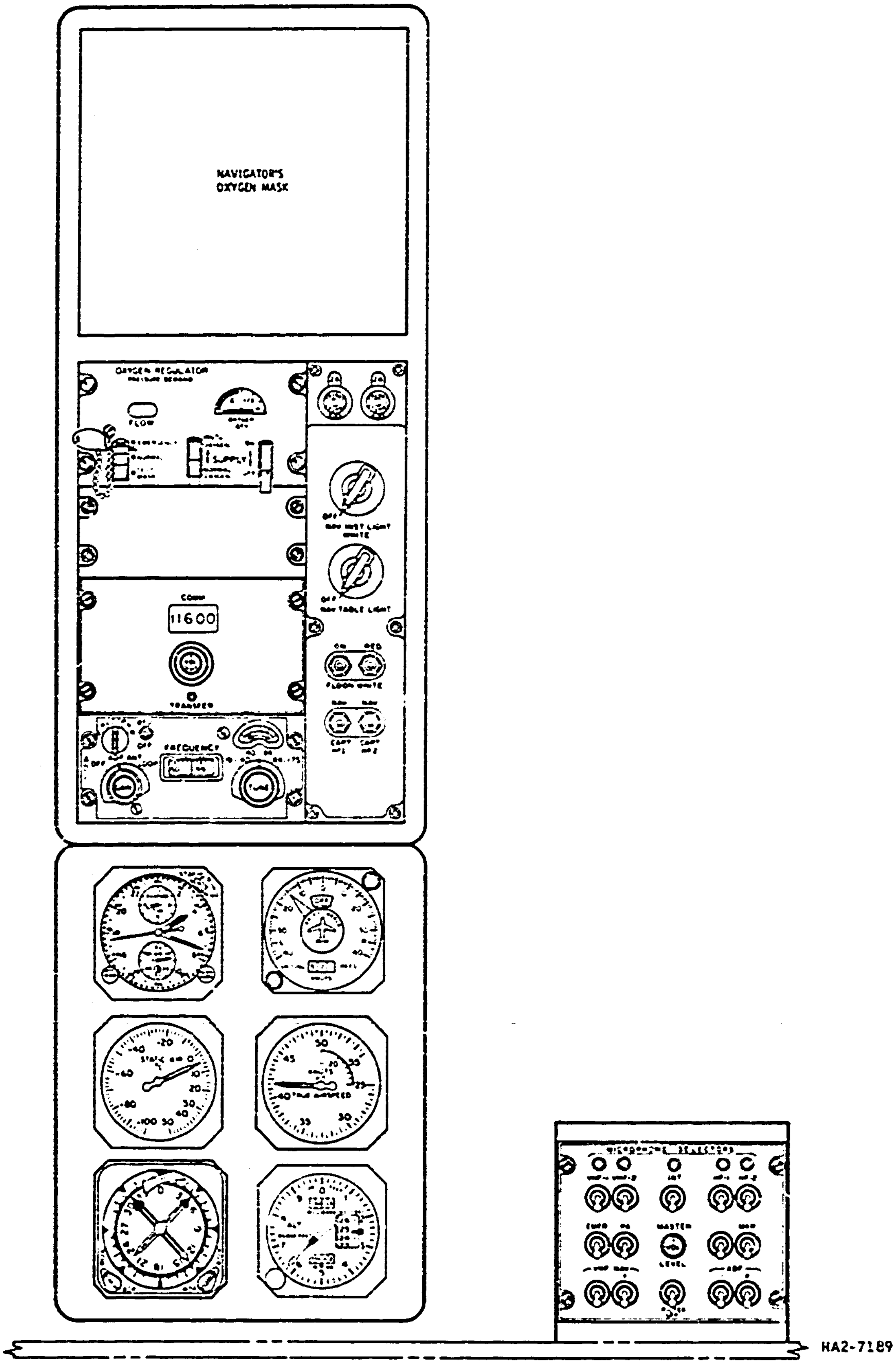
B = BLUE INDICATING
* NOT INSTALLED ON 60-62,64-67

HA2-6407A

Navigator's/Observer's Instrument Panel
Figure 1



Navigator's/Observer's Instrument Panel
Figure 1



Navigator's/Observer's Instrument Panel
Figure 1

NAVIGATOR'S/OBSERVERS INSTRUMENT PANEL - MAINTENANCE PRACTICES

1. General

A. In order to remove the navigator's light control panel, it is necessary to remove all power from the airplane and to disconnect all electrical wires and connector from the navigator's light control panel.

B. When a panel is replaced, an operational test should be performed to verify the integrity of all systems involved.

2. Removal/Installation Navigator's Light Control Panel

A. Remove Panel

(1) Remove power from airplane.

WARNING: TAG EXTERNAL POWER RECEPTACLE WITH WARNING SIGN.

(2) Manually support panel and loosen six screws.

(3) Slide panel out a few inches and disconnect electrical wires and connectors.

(4) Remove panel.

(5) Tag and cap electrical wires and connector.

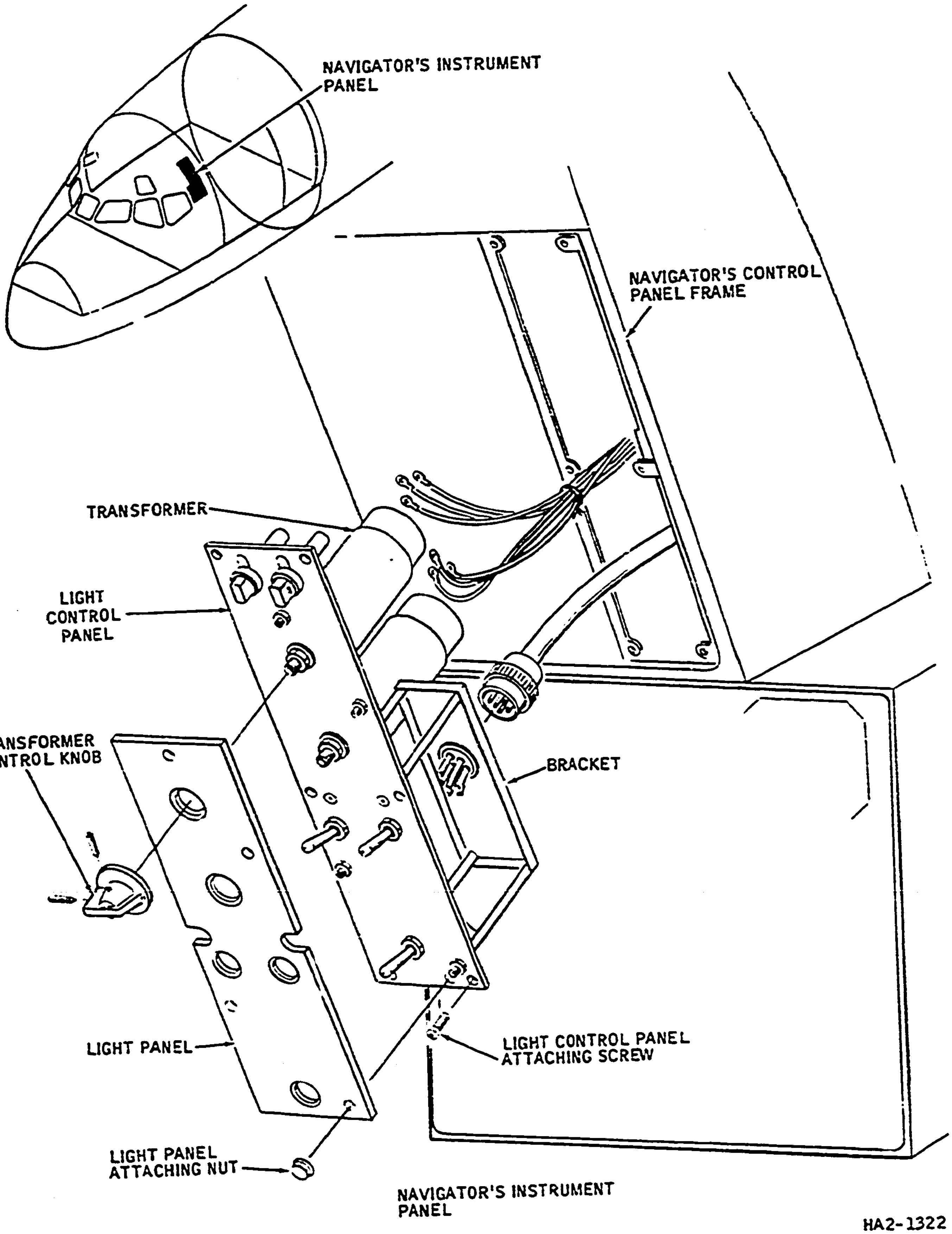
B. Install Panel

(1) Verify power is removed from airplane.

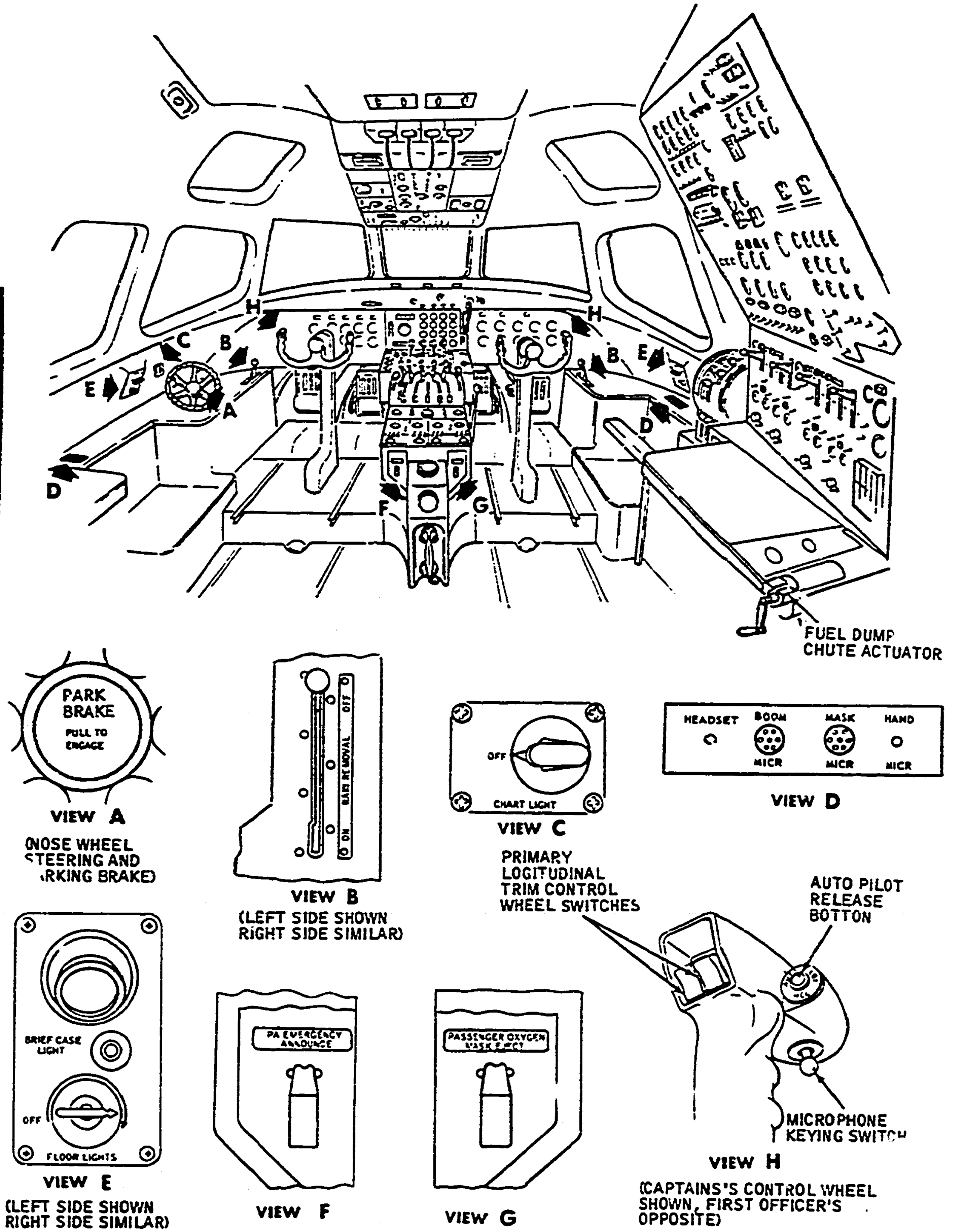
(2) Remove cap from electrical connector, place panel in cavity, and connect electrical wires and connector.

(3) Secure panel in cavity with screws around perimeter.

(4) Perform operational test of all systems involved to determine integrity of new installation.

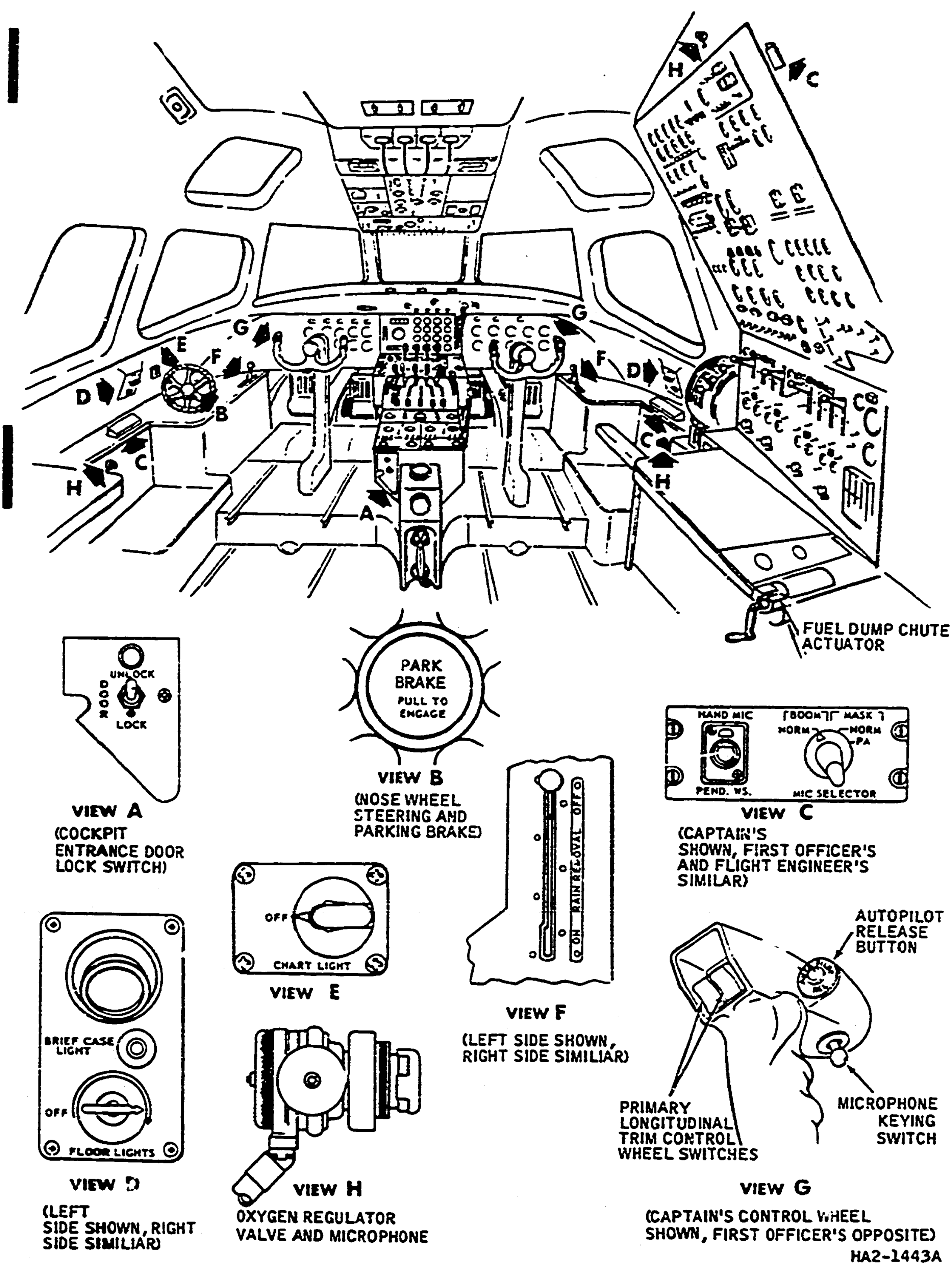


Navigator's/Observer's Instrument
Panel Maintenance
Figure 201

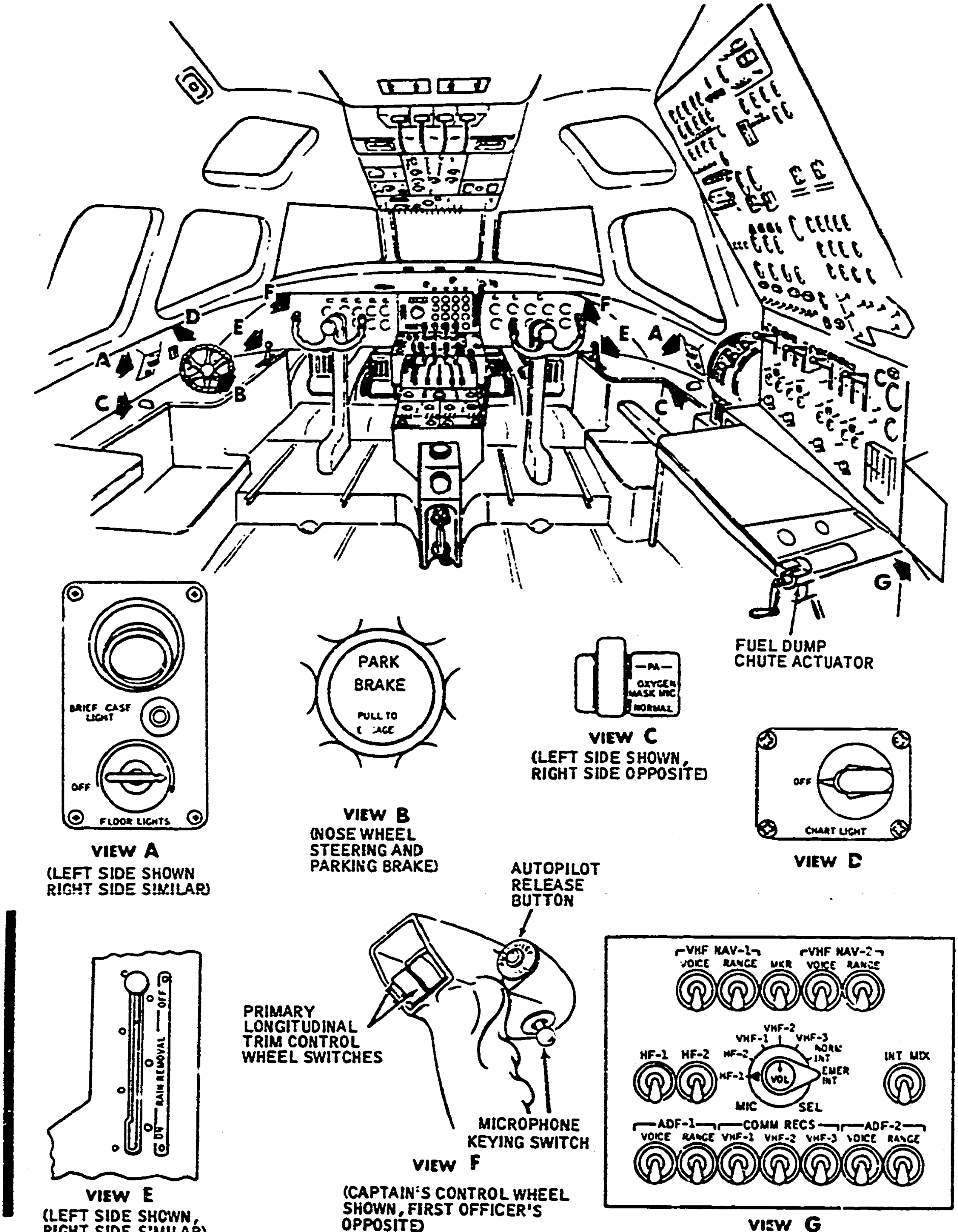


HA2-1442A

Miscellaneous Controls
Figure 1

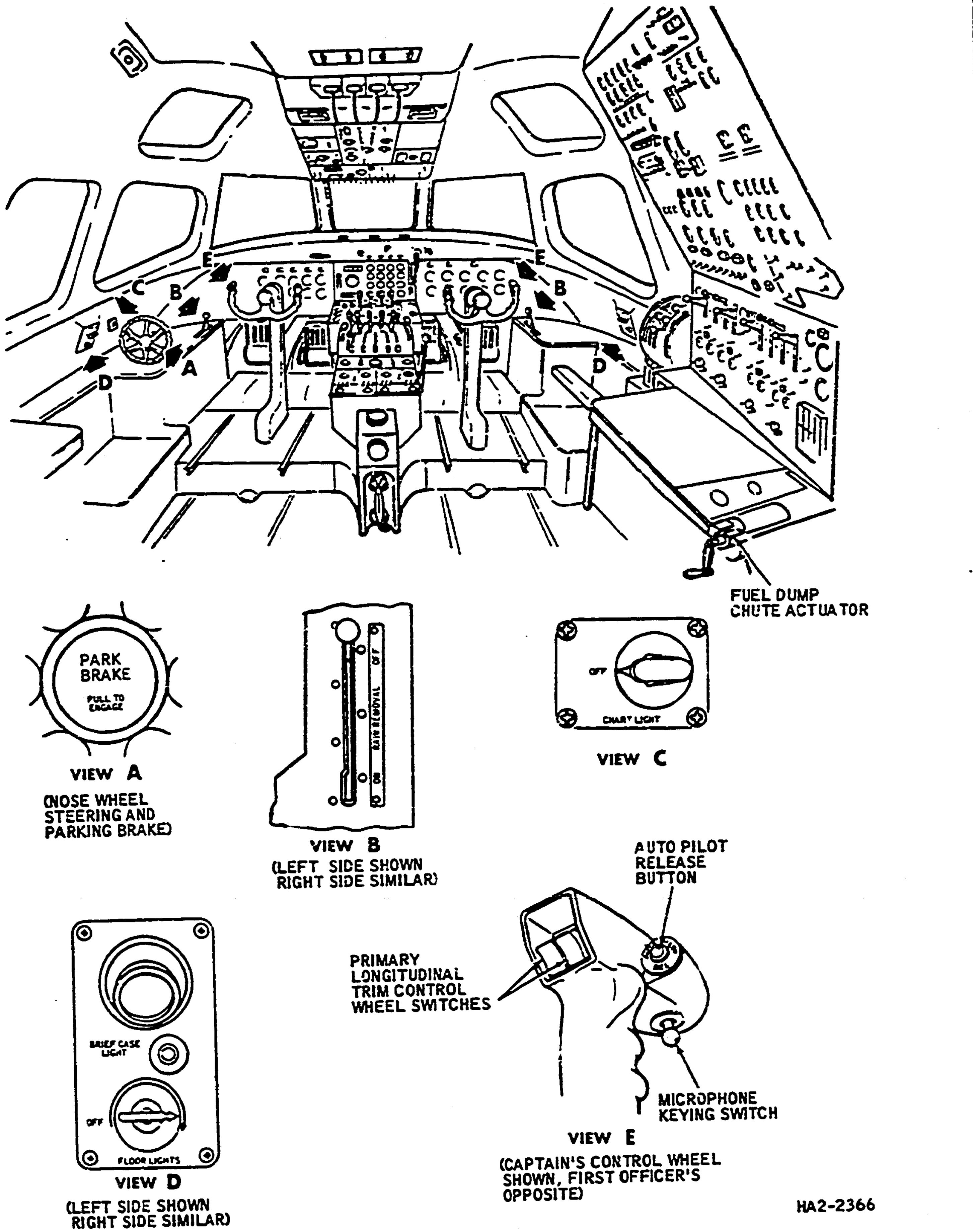


Miscellaneous Controls
Figure 1

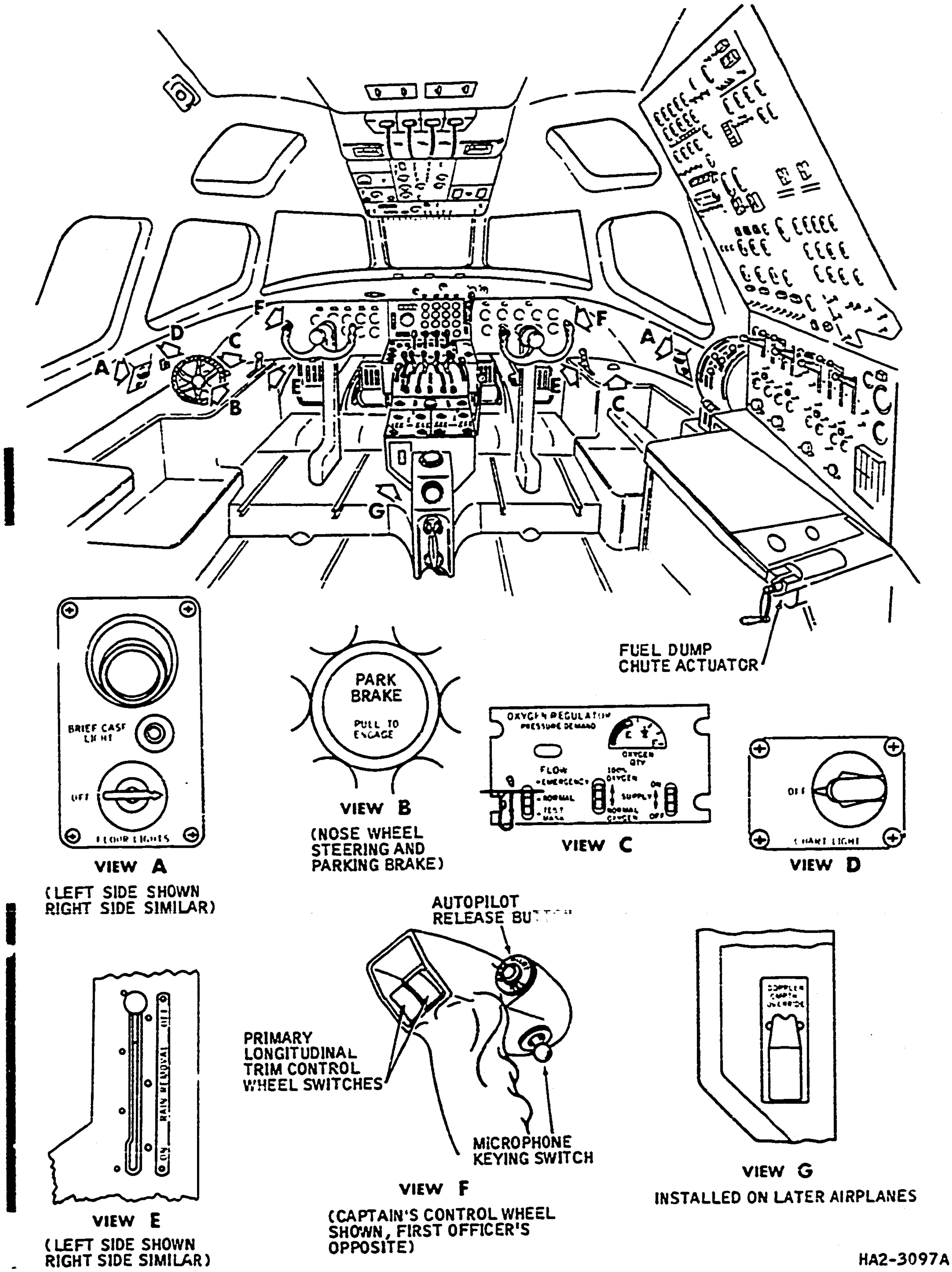


HA2-1444A

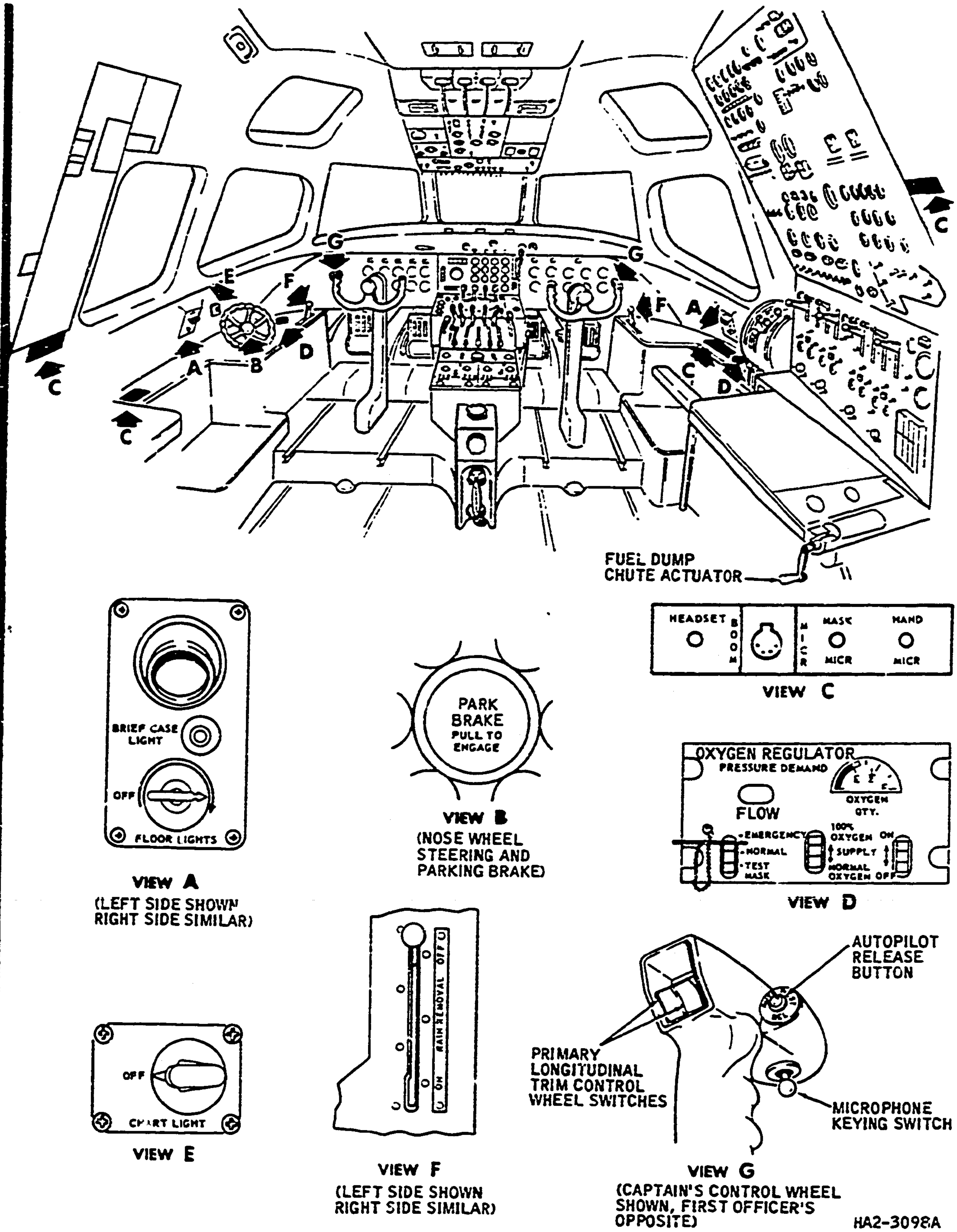
Miscellaneous Controls
Figure 1



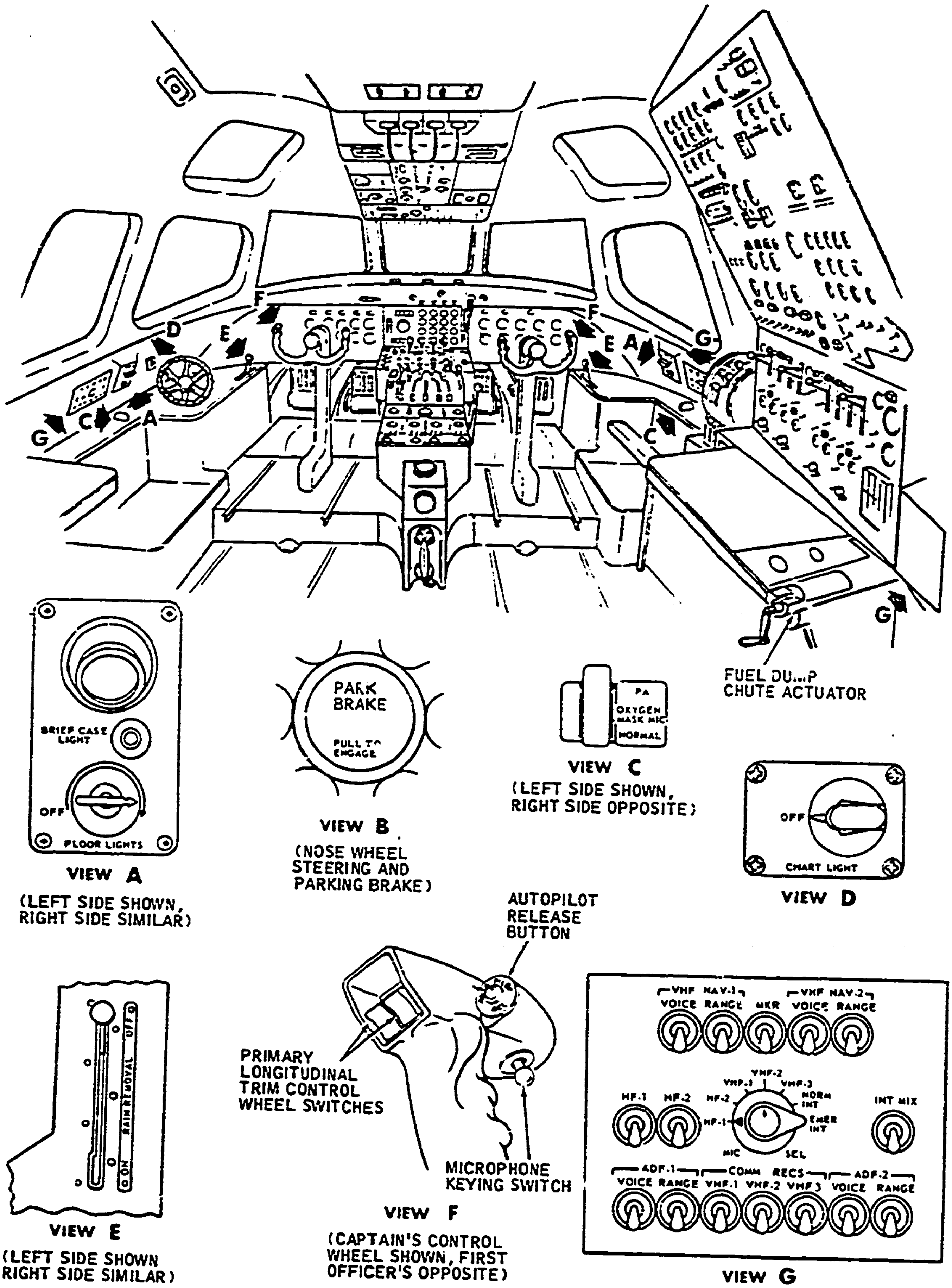
Miscellaneous Controls
Figure 1



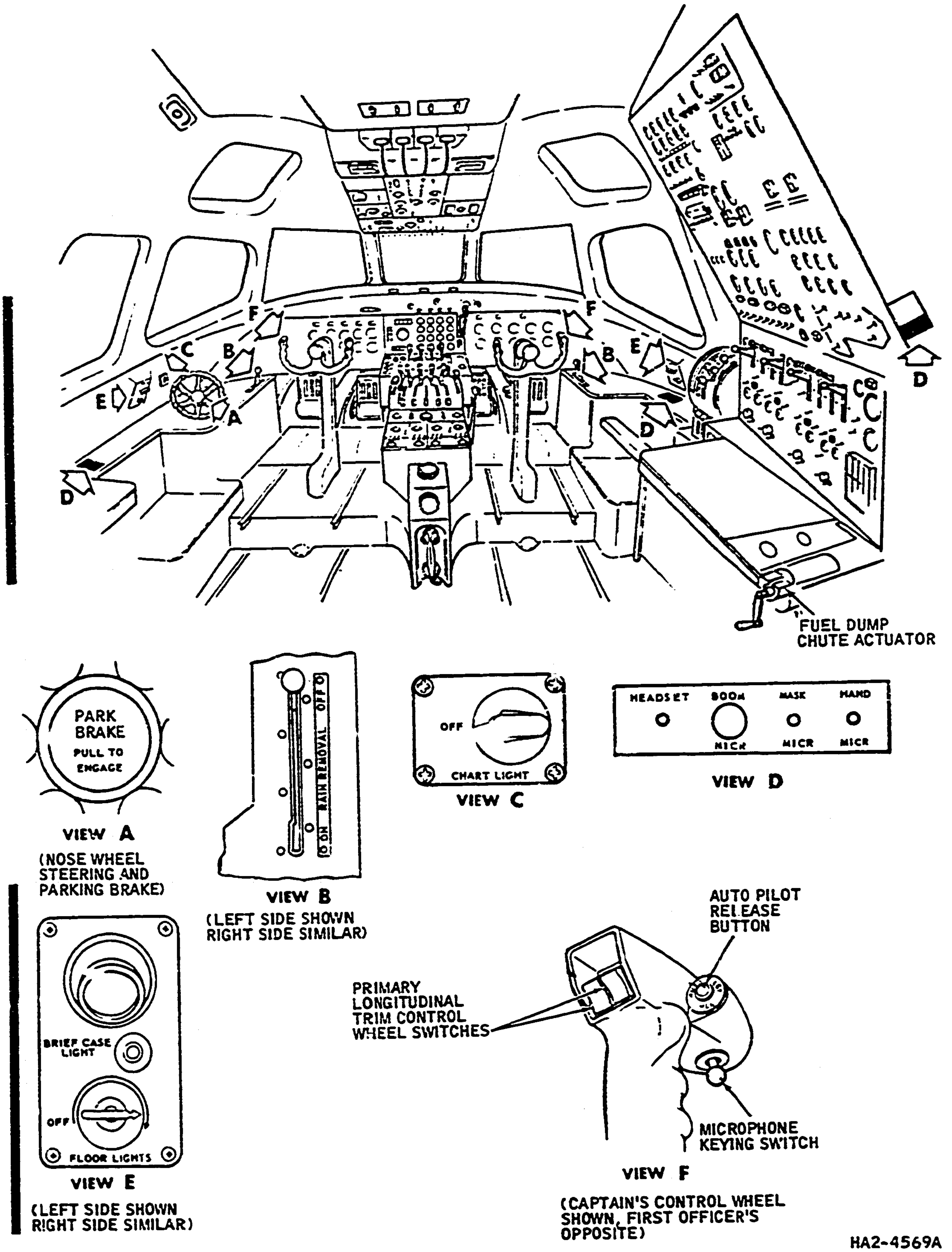
Miscellaneous Controls
Figure 1



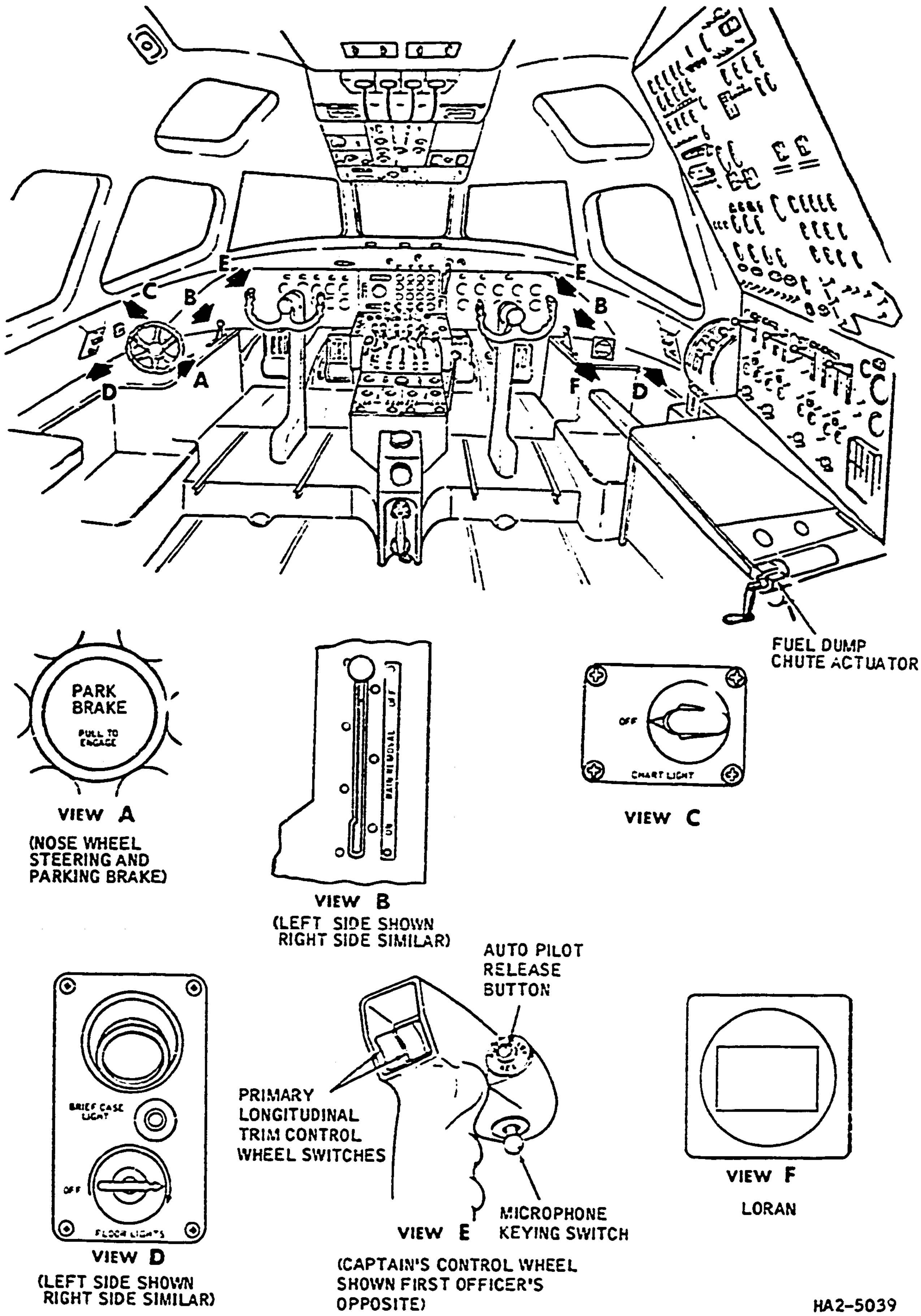
Miscellaneous Controls
Figure 1



Miscellaneous Controls
Figure 1



Miscellaneous Controls
Figure 1



Miscellaneous Controls
Figure 1

INSTRUMENT LIMITATION MARKINGS - MAINTENANCE PRACTICES

1. General

A. The instrument markings reflect the latest operating limitations. The instruments are shown in a static condition at sea level. The instruments having limit markings are divided into five groups as follows:

Hydraulic

Exhaust Gas Temperature and Tachometers

Fuel

Oil

Air Conditioning

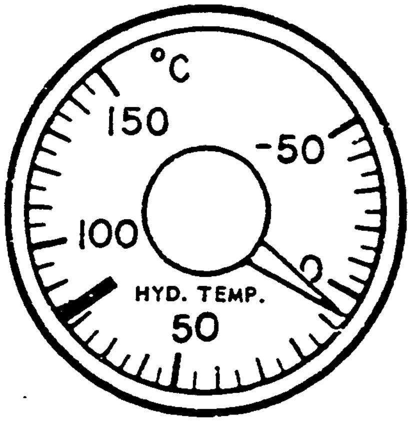
B. Three colors (red, yellow, and green) are used to mark the instruments and have the following meaning:

Red - DANGER

Yellow - CAUTION

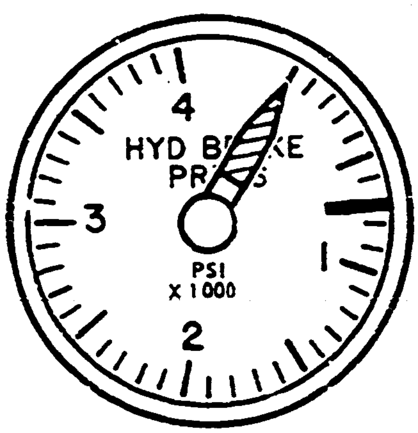
Green - Normal Operating

C. When installing an instrument, check for correct limitation markings.



HYDRAULIC OIL
TEMPERATURE

82°C MAXIMUM (RED)

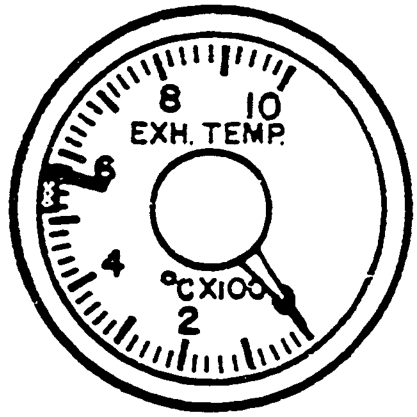


HYDRAULIC BRAKE
PRESSURE

700 PSI MINIMUM (RED)

HA2-6896

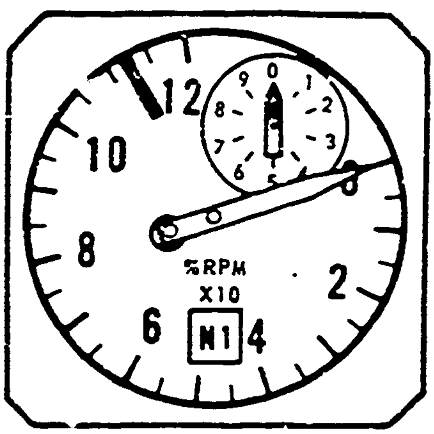
Instrument Limitation Markings -- Hydraulic
Figure 201



EXHAUST GAS
TEMPERATURE

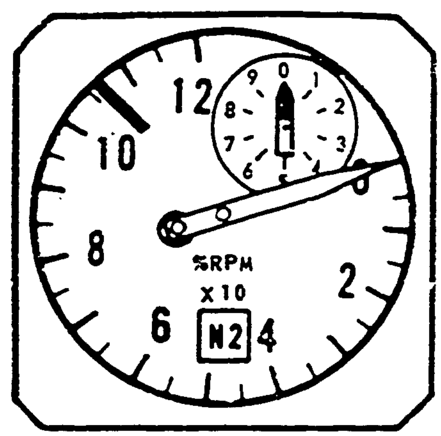
■ 575° C MAXIMUM (RED)

░ 510° C TO 575° C CAUTION (YELLOW)



N_1 TACHOMETER

■ 110.8% MAXIMUM (RED)

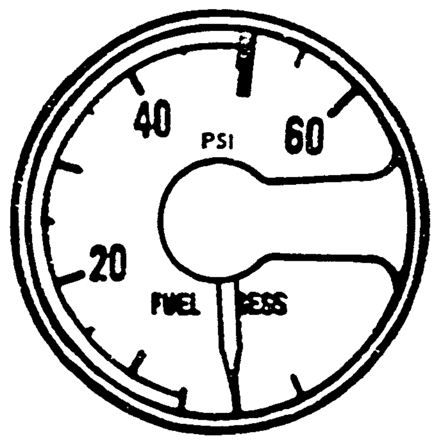


N_2 TACHOMETER

■ 106.7% MAXIMUM (RED)

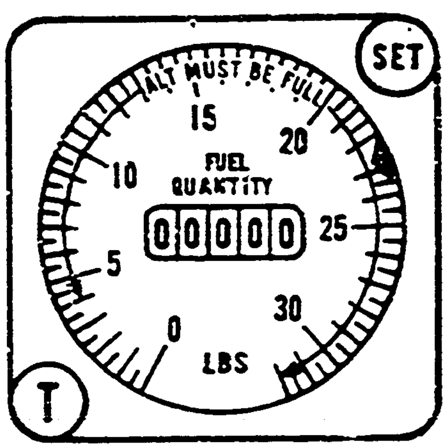
HA2-6897

Instrument Limitation Markings -- Exhaust Gas
Temperature and Tachometers
Figure 202



FUEL PRESSURE

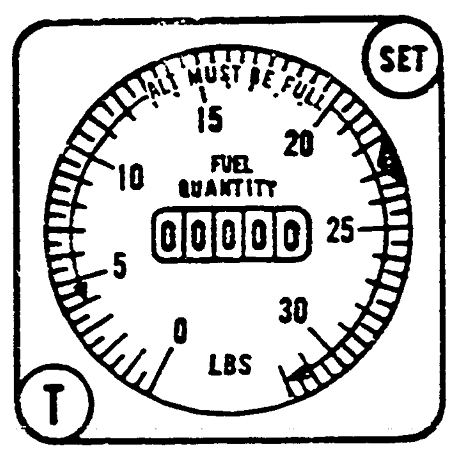
50 PSI MAXIMUM (RED)
5 TO 50 PSI NORMAL (GREEN)



#1 MAIN FUEL QTY

FUEL QUANTITY

4000 TO 32,000 POUNDS
ALT FUEL TANK MUST BE FULL



#4 MAIN FUEL QTY

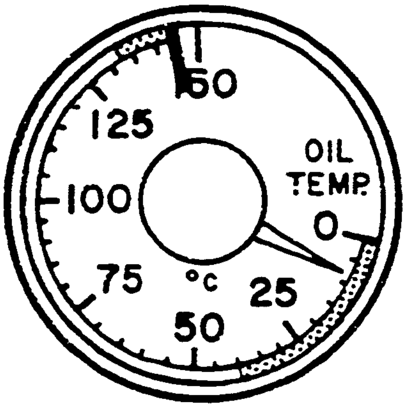
FUEL QUANTITY

4000 TO 32,000 POUNDS
ALT FUEL TANK MUST BE FULL

HA2-6898

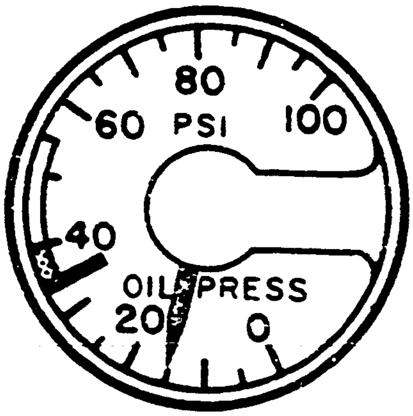
Instrument Limitation Markings -- Fuel
Figure 203

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OIL TEMPERATURE

- (Red) 143° C MAXIMUM (RED)
- (Yellow) 0° C TO 40° C AND 132 C TO 143° C CAUTION (YELLOW)
- (Green) 40° C TO 132° C NORMAL (GREEN)

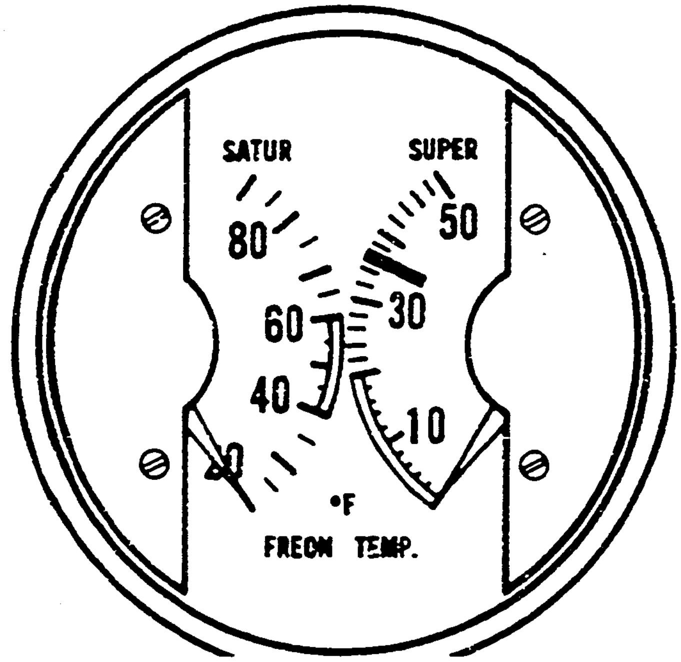


OIL PRESSURE

- (Red) 35 PSI MINIMUM (RED)
- (Yellow) 35 TO 40 PSI CAUTION (YELLOW)
- (Green) 40 TO 55 PSI NORMAL (GREEN)

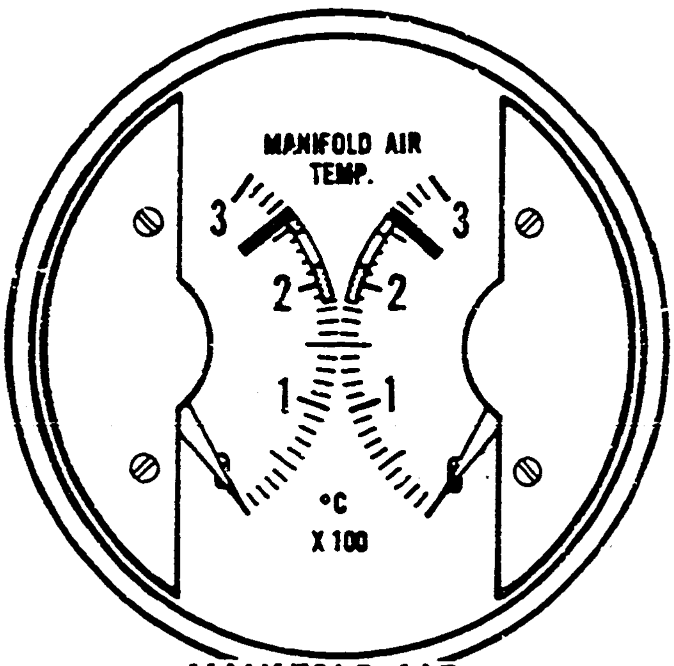
HA2-6899

Instrument Limitation Markings -- Oil
Figure 204



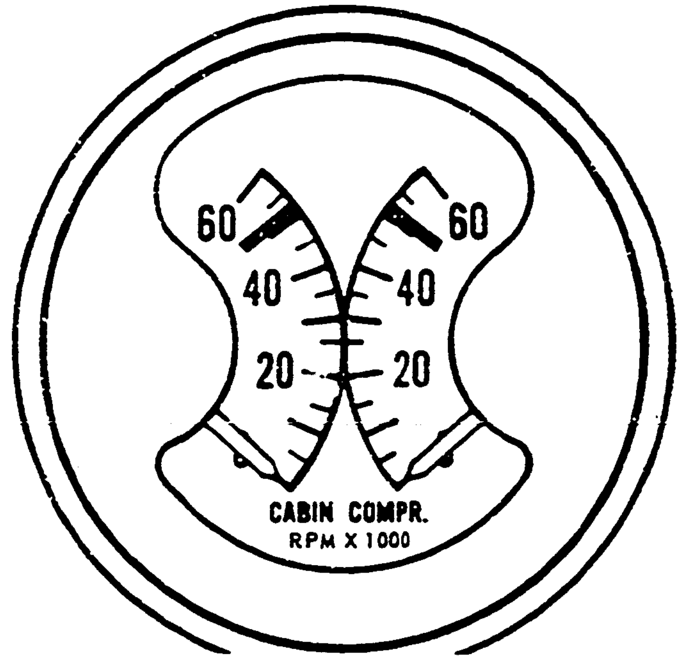
FREON SUPERHEAT AND
SATURATION TEMPERATURE

- 35°F MAXIMUM (RED) - SUPERHEAT
- 0°F TO 20°F NORMAL (GREEN) - SUPERHEAT
- 40°F TO 60°F NORMAL (GREEN) - SATURATION



MANIFOLD AIR
TEMPERATURE

- 258°C MAXIMUM (RED)
- 242°C TO 258°C CAUTION (YELLOW)
- 182°C TO 214°C CAUTION (YELLOW)
- 214°C TO 242°C NORMAL (GREEN)



CABIN COMPRESSOR RPM

- 50,000 RPM MAXIMUM (RED)

HA2-6900

Instrument Limitation Markings --
Air Conditioning
Figure 205

INDEPENDENT INSTRUMENTS - DESCRIPTION AND OPERATION

1. General

A. Independent instruments consist of components or systems which are not related to any major system of the airplane. Independent instruments discussed in this section include clocks and the flight recorder.

B. The clocks are spring-operated, 8-day clocks and are located on the captain's flight instrument panel, the first officer's flight instrument panel, and the systems engineer's control panel. The clocks have integrally lighted dials.

C. The flight recording system maintains an inflight record of altitude, indicated airspeed, heading, and vertical acceleration. Inputs are also included from the VHF-1 and VHF-2 communications systems to indicate that the microphone push-to-talk switch has been pressed. All inputs to the flight recorder are calibrated on a recording medium with respect to time. The recording system is a fireproof mechanism which is able to withstand extreme shocks and vibration. The recording unit is located on the radio rack.

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C. The flight recording system maintains an inflight record of altitude, indicated airspeed, heading, and vertical acceleration. All inputs to the flight recorder are calibrated on a recording medium with respect to time. The recording system is a fireproof mechanism which is able to withstand extreme shocks and vibration. The recording unit is located above the aft cabin ceiling.

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B. The clocks are spring-operated, 8-day clocks and are located on the captain's flight instrument panel, and the first officer's flight instrument panel. The clocks have integrally lighted dials.

C. The flight recording system maintains an inflight record of altitude, indicated airspeed, heading, and vertical acceleration. All inputs to the flight recorder are calibrated on a recording medium with respect to time. The recording system is a fireproof mechanism which is able to withstand extreme shocks and vibration. The recording unit is located on a mount in the tail compartment.

INDEPENDENT INSTRUMENTS - DESCRIPTION AND OPERATION

1. General

A. Independent instruments consist of components or systems which are not related to any major system of the airplane. Independent instruments discussed in this section include clocks and the flight recorder.

B. The clocks are spring-operated, 8-day clocks and are located on the captain's flight instrument panel, the first officer's flight instrument panel, the systems engineer's control panel, and the navigator's/observer's instrument panel. The clocks have integrally lighted dials.

C. The flight recording system maintains an inflight record of altitude, indicated airspeed, heading, and vertical acceleration. All inputs to the flight recorder are calibrated on a recording medium with respect to time. The recording system is a fireproof mechanism which is able to withstand extreme shocks and vibration. The recording unit is located on the radio rack on airplanes PH-DEA through PH-DEE and on the aft overhead ceiling on airplanes PH-DEF, PH-DEG, PH-DEH, PI-C827, PI-C829, YV-C-VIA, and YV-C-VIB.

INDEPENDENT INSTRUMENTS - DESCRIPTION AND OPERATION

1. General

   A. Independent instruments consist of components or systems which are not related to any major system of the airplane. Independent instruments discussed in this section include clocks.

   B. The clocks are spring-operated, 8-day clocks and are located on the captain's flight instrument panel, the first officer's flight instrument panel, the systems engineer's control panel, and the navigator's/observer's instrument panel. The clocks have integrally lighted dials.

INDEPENDENT INSTRUMENTS - DESCRIPTION AND OPERATION

1. General

   A. Independent instruments consist of components or systems which are not related to any major system of the airplane. Independent instruments discussed in this section include clocks.

   B. The clocks are spring-operated, 8-day clocks and are located on the captain's flight instrument panel, the first officer's flight instrument panel, and the navigator's/observer's instrument panel. The clocks have integrally lighted dials.

INDEPENDENT INSTRUMENTS - DESCRIPTION AND OPERATION

1. General

A. Independent instruments consist of components or systems which are not related to any major system of the airplane. Independent instruments discussed in this section include clocks and the flight recorder.

B. The clocks are spring-operated, 8-day clocks and are located on the captain's flight instrument panel, the first officer's flight instrument panel, the systems engineer's control panel, and the navigator's/observer's instrument panel. The clocks have integrally lighted dials.

C. The flight recording system maintains an inflight recorder of altitude, indicated airspeed, heading, and vertical acceleration. All inputs to the flight recorder are calibrated on a recording medium with respect to time. The recording system is a fireproof mechanism which is able to withstand extreme shocks and vibration. The recording unit is located above the aft cabin ceiling.

CLOCKS - DESCRIPTION AND OPERATION

1. General

A. There are three clocks installed on the airplane. One clock is installed on the captain's instrument panel, one clock is installed on the first officer's instrument panel, and one clock is installed on the navigator's/observer's instrument panel.

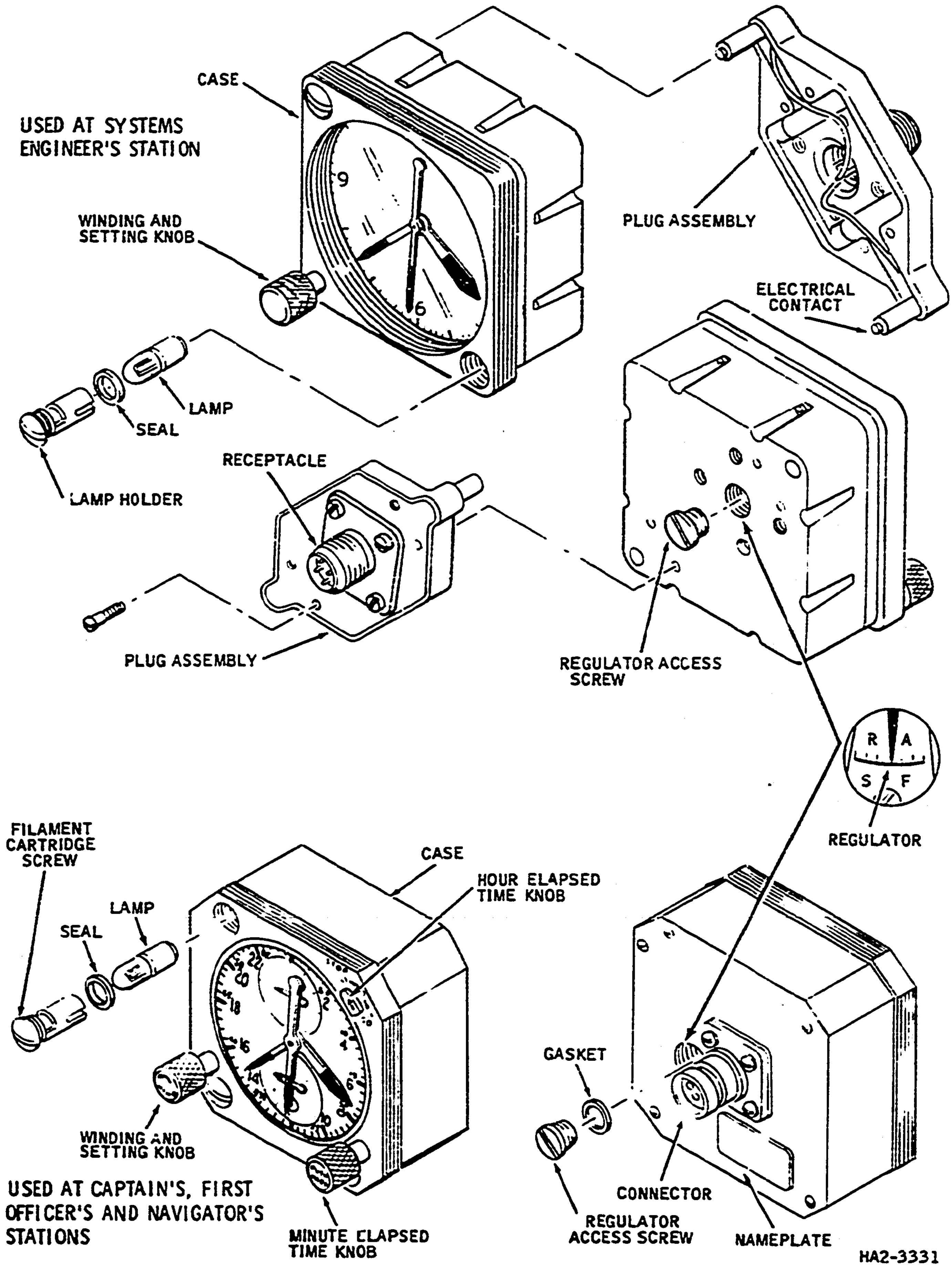
B. The clock installed on the first officer's instrument panel is an 8-day clock with a 12-hour dial. The hands include an hour hand, a minute hand, and a sweep second hand. The clock is set and wound manually. One complete winding is sufficient for a minimum of 8 days of operation. The winding knob, located on the lower left corner of the face, is also used as a setting knob. The knob must be pulled out and rotated to set the hour and minute hands to the correct time. The sweep second hand cannot be reset.

C. Two lamps, installed from the front, provide dial face lighting. The clock is equipped with a receptacle which is used to supply power to the integral lights for dial lighting.

D. The two remaining clocks, installed on the captain's, and navigator's/observer's instrument panels, are 8-day elapsed-time clocks. The main dial is calibrated in minutes, numbered with small numerals in increments of 5 to 60 minutes. The dial is also calibrated in hours, numbered with large numerals in increments of 2 to 24 hours. Three hands, an hour hand, a minute hand, and a sweep second hand are used in conjunction with the main dial. A small dial located on the upper half of the clock face is divided into twelve 1-hour increments and is numbered 3, 6, 9, and 12. An hour hand works in conjunction with this dial to measure elapsed time to 12 hours. A similar dial located on the lower half of the clock face is divided into 12 increments numbered by 10 to 60. A minute hand working in conjunction with this dial indicates elapsed time to 60 minutes.

E. The clocks are set and wound manually. One winding is sufficient for a minimum of 8 days of operation. The winding knob, located on the lower left corner of the clock face is also used as a setting knob. The knob must be pulled out and rotated to set the hour and minute hand to the correct time. The sweep second hand cannot be reset. The elapsed-time knob for the minute elapsed-time hand is located on the lower right corner of the clock face. An indicator in the minute elapsed-time dial shows the operating condition. When the indicator is white, the register is not working. Push the knob to start the minute elapsed-time hand and the indicator will appear black. Push the knob a second time to stop the minute elapsed-time hand and the indicator will appear half black and half white. Push the knob a third time to return the hand to zero and the indicator will appear white. The elapsed-time knob for the hour elapsed-hand is located on the upper right corner of the clock face. The knob has three placarded positions: stop, 0, and go. Arrows are placarded between each position to indicate the direction of knob rotation.

Printed in U.S.A.



Eight-Day Clock
Figure 1

Printed in U.S.A.

F. Four integral lamps provide dial face lighting for the elapsed-time clocks. The lamps are front mounted and readily replaced. A receptacle is located on the back of the clocks to supply power to the integral lights for dial lighting.

G. All clocks must be removed from the panel to gain access to the speed-regulating lever. The clocks are mounted on the panel with standard clamp mounts. To regulate the speed of the clocks, remove the regulator access plug and adjust the regulating lever. One division of the dial will alter the clock rate from 1 to 2 minutes per day.

CLOCKS - DESCRIPTION AND OPERATION

1. General

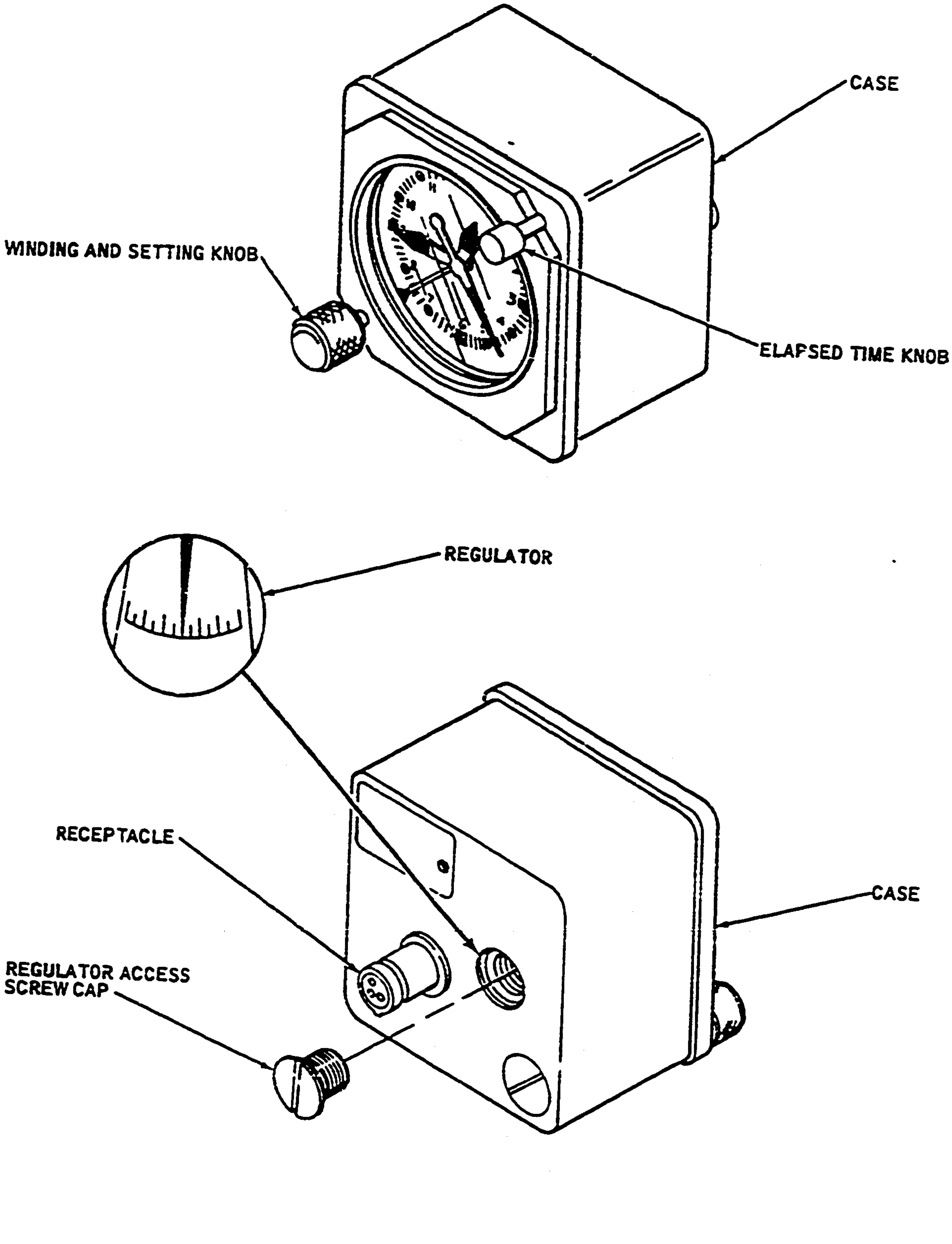
   A. There are three clocks installed on the airplane. One clock is installed on the captain's flight instrument panel, one clock is installed on the first officer's flight instrument panel, and one clock is installed on the navigator's/observer's instrument panel.

   B. The clocks are 8-day elapsed-time clocks with 12-hour dials. Four hands operate from the center of the dial on concentric shafts. The hands include an hour hand, a minute hand, and a sweep-second hand. The fourth hand has a unique arrowhead tip and is used to indicate elapsed time to 12 minutes.

   C. The clocks are set and wound manually. One winding is sufficient for a minimum of 8 days of operation. The winding knob, located on the lower left corner of the face, is also used as a setting knob. The knob must be pulled out and rotated to set the hour and minute hands to the correct time. The sweep-second hand cannot be reset. The elapsed-time knob is located on the upper right corner of the face. The knob is pushed to start the elapsed-time hand, pushed a second time to stop the elapsed-time hand, and pushed a third time to return the hand to zero hours.

   D. Four integral lamps provide dial face lighting. The clock must be removed from the panel and opened to replace burned out lamps. A receptacle is located on the back of the clock to supply power to the integral lights for dial lighting.

   E. The clocks must be removed from the panel to gain access to the speed-regulating lever. The clocks are mounted on the panel with standard clamp mounts. To regulate the speed of the clocks, remove the regulator access plug and adjust the regulating lever. One division of the dial will alter the clock rate from 1 to 2 minutes per day.



Eight-Day Clock
Figure 1

Printed in U.S.A.

CLOCKS - DESCRIPTION AND OPERATION

1. General

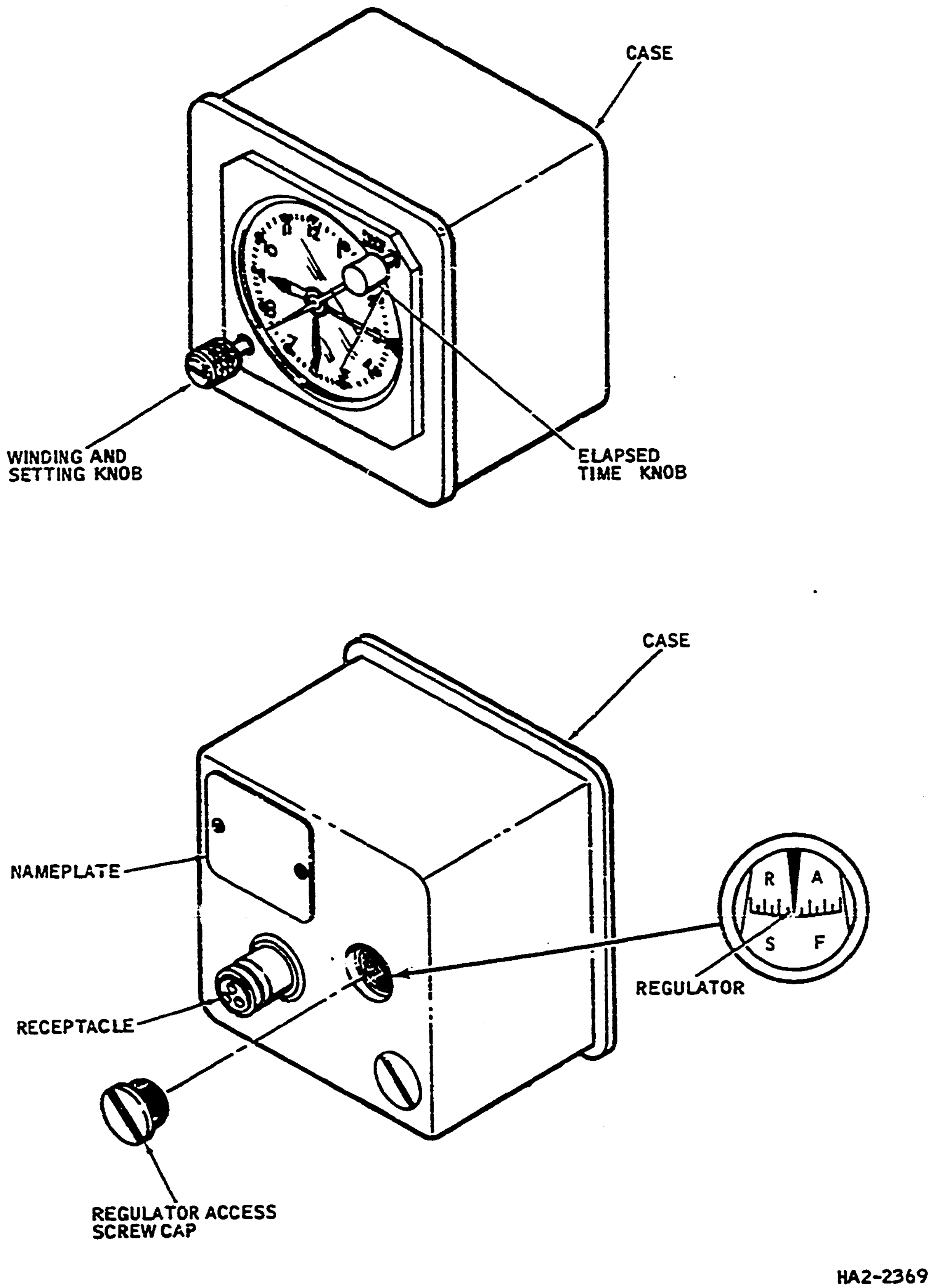
A. There are three clocks installed on the airplane. One clock is installed on the captain's flight instrument panel, one clock is installed on the first officer's flight instrument panel, and one clock is installed on the systems engineer's control panel (upper section).

B. The clocks are 8-day elapsed-time clocks with standard 12-hour dials. Four hands operate from the center of the dial on concentric shafts. The hands include an hour hand, a minute hand, and a sweep second hand. The fourth hand has a unique arrowhead tip and is used to indicate elapsed time to 12 minutes.

C. The clocks are set and wound manually. One winding is sufficient for a minimum of 8 days of operation. The winding knob, located on the lower left corner of the face, is also used as a setting knob. The knob must be pulled out and rotated to set the hour and minute hands to the correct time. The sweep second hand cannot be reset. The elapsed-time knob is located on the upper right corner of the face. The knob is pushed to start the elapsed-time hand, pushed a second time to stop the elapsed-time hand, and pushed a third time to return the hand to zero hours.

D. Four integral lamps provide dial face lighting. The clock must be removed from the panel and opened to replace burned out lamps. A receptacle is located on the back of the clock to supply power to the integral lights for dial lighting.

E. The clocks must be removed from the panel to gain access to the speed-regulating lever. The clocks are mounted on the panel with standard clamp mounts. To regulate the speed of the clocks, remove the regulator access plug and adjust the regulating lever. One division of the dial will alter the clock rate from 1 to 2 minutes per day.



Eight-Day Clock
Figure 1

CLOCKS - DESCRIPTION AND OPERATION

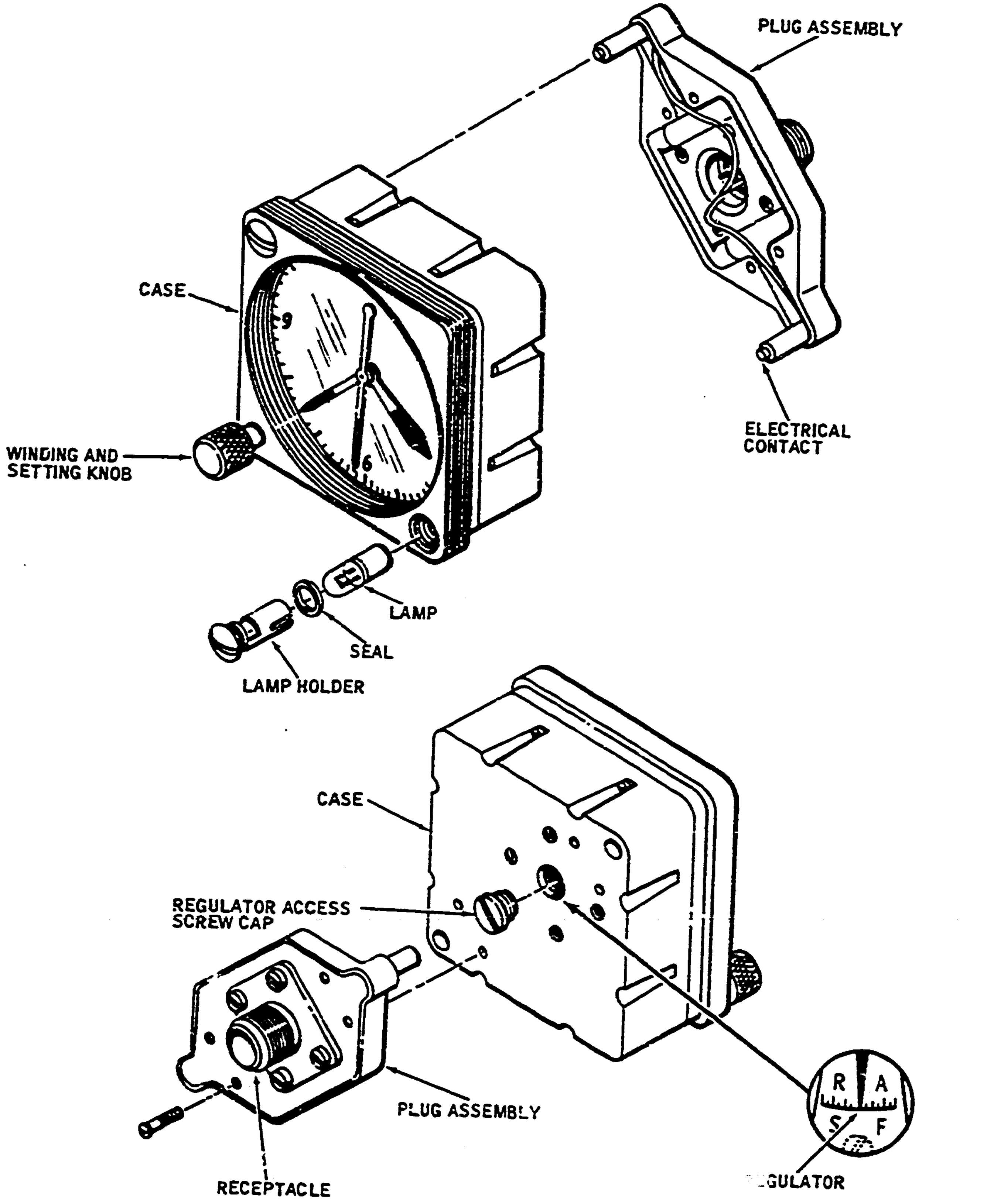
1. General

   A. There are two clocks installed on the airplane. One clock is installed on the captain's flight instrument panel and one clock is installed on the first officer's flight instrument panel.

   B. The clocks are 8-day clocks with 12-hour dials. The hands include an hour hand, a minute hand, and a sweep second hand. The clocks are set and wound manually. One complete winding is sufficient for a minimum of 8 days of operation. The winding knob, located on the lower left corner of the face, is also used as a setting knob. The knob must be pulled out and rotated to set the hour and minute hands to the correct time. The sweep second hand cannot be reset.

   C. Two lamps, installed from the front, provide dial face lighting. The clock is equipped with a receptacle which is used to supply power to the integral lights for dial lighting.

   D. The clocks must be removed from the panel to gain access to the speed-regulating lever. The clocks are mounted on the panel with standard clamp mounts. To regulate the speed of the clocks, remove the regulator access screw and adjust the regulating lever. One division of the dial will alter the clock rate from 1 to 2 minutes per day.



Eight-Day Clock
Figure 1

CLOCKS - DESCRIPTION AND OPERATION

1. General

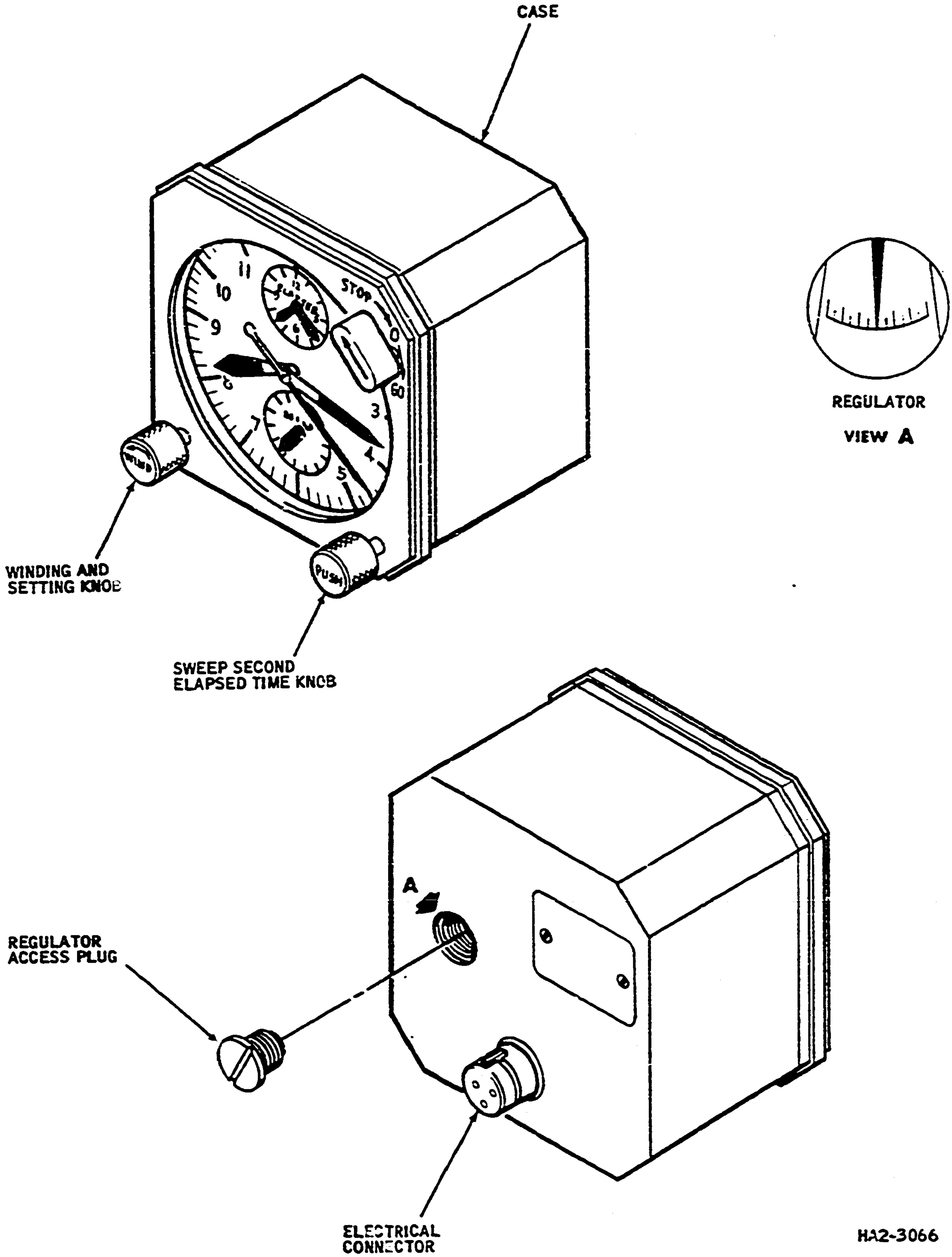
A. There are three clocks installed on the airplane. One clock is installed on the captain's instrument panel, one clock is installed on the first officer's instrument panel, and one clock is installed on the systems engineer's control panel.

B. The clocks are 8-day elapsed time clocks having a main dial calibrated in minutes and hours to twelve hours with secondary numerals to 24 hours. Three hands, an hour hand, a minute hand, and a second hand, are used in conjunction with the main dial. A small dial located on the upper half of the clock face is divided into twelve 1-hour increments. An hour hand and a minute hand work in conjunction with this dial to measure elapsed time to 12 hours. A similar dial located on the lower half of the clock face is divided into 15 increments. A minute hand working in conjunction with this dial indicates elapsed time to 15 minutes.

C. The clocks are set and wound manually. One winding is sufficient for a minimum of 8 days of operation. The winding knob, located on the lower left corner of the face, is also used as a setting knob. The knob must be pulled out and rotated to set the hour and minute hands to the correct time. The sweep second hand cannot be reset. The sweep second hand elapsed-time knob is located on the lower right corner of the clock face. The knob must be pushed to start the sweep second hand, pushed a second time to stop the hand, and pushed a third time to return the hand to zero. The elapsed time knob for the hour and minute elapsed time hands is located on the upper right corner of the clock face. The knob has three placarded positions: stop, 0, and go. Arrows are placarded between each position to indicate the direction of knob rotation.

D. Four integral lamps provide dial face lighting. The clock must be removed from the panel and opened to replace the lamps. A receptacle is located on the back of the clock to supply power to the integral lights for dial lighting.

E. The clocks must be removed from the panel to gain access to the speed-regulating lever. The clocks are mounted on the panel with standard clamp mounts. To regulate the speed of the clocks, remove the regulator access plug and adjust the regulating lever. One division of the dial will alter the clock rate from 1 to 2 minutes per day.



Eight-Day Clock
Figure 1

CLOCKS - DESCRIPTION AND OPERATION

1. General

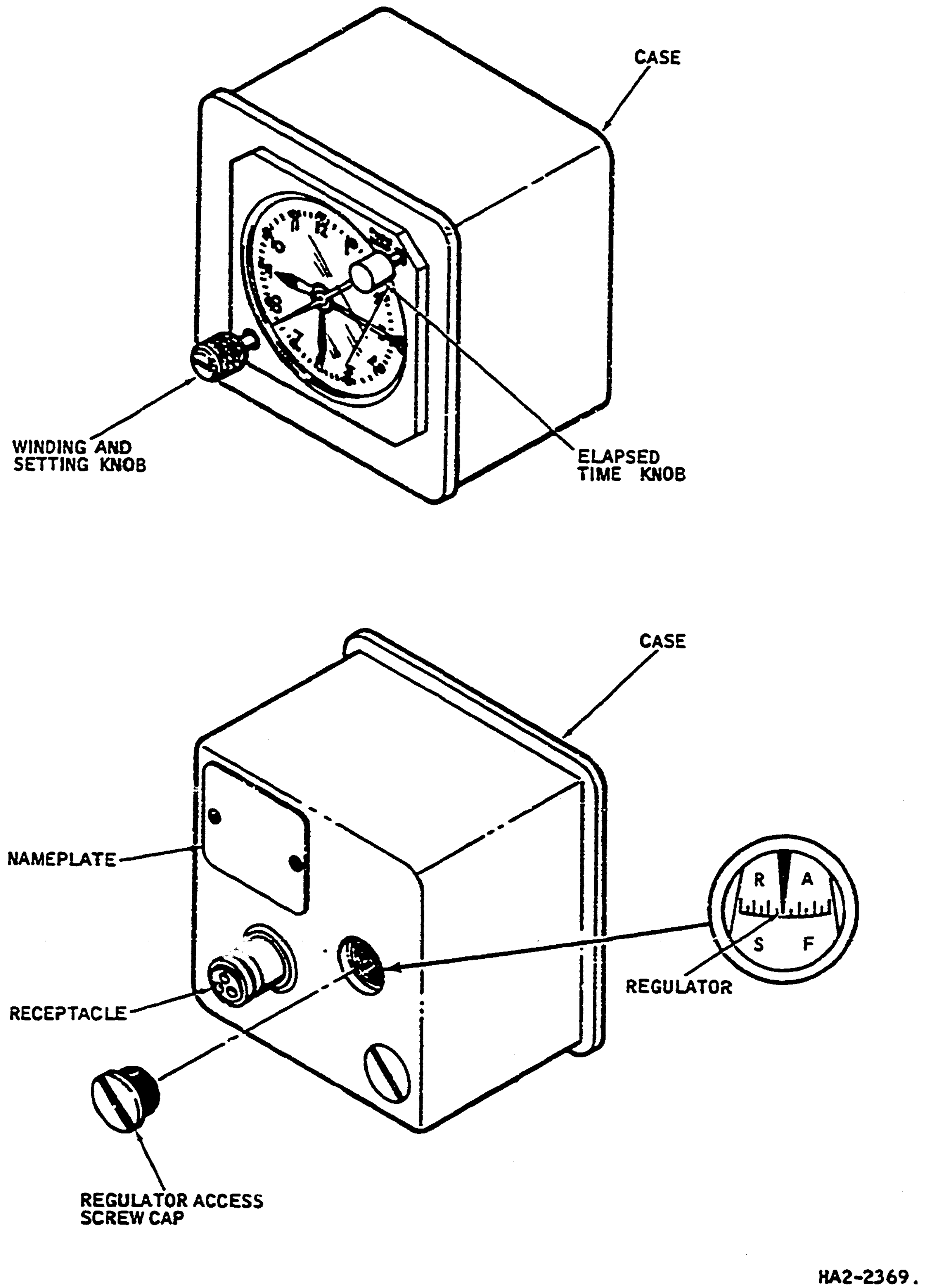
A. There are two clocks installed on the airplane. One clock is installed on the captain's flight instrument panel, and one clock is installed on the first officer's flight instrument panel.

B. The clocks are 8-day elapsed-time clocks with standard 12-hour dials. Four hands operate from the center of the dial on concentric shafts. The hands include an hour hand, a minute hand, and a sweep second hand. The fourth hand has a unique arrowhead tip and is used to indicate elapsed time to 60 minutes.

C. The clocks are set and wound manually. One winding is sufficient for a minimum of 8 days of operation. The winding knob, located on the lower left corner of the face, is also used as a setting knob. The knob must be pulled out and rotated to set the hour and minute hands to the correct time. The sweep second hand cannot be reset. The elapsed-time knob is located on the upper right corner of the face. The knob is pushed to start the elapsed-time hand, pushed a second time to stop the elapsed-time hand, and pushed a third time to return the hand to zero hours.

D. Four integral lamps provide dial face lighting. The clock must be removed from the panel and opened to replace burned out lamps. A receptacle is located on the back of the clock to supply power to the integral lights for dial lighting.

E. The clocks must be removed from the panel to gain access to the speed-regulating lever. The clocks are mounted on the panel with standard clamp mounts. To regulate the speed of the clocks, remove the regulator access plug and adjust the regulating lever. One division of the dial will alter the clock rate from 1 to 2 minutes per day.



Eight-Day Clock
Figure 1

CLOCKS - DESCRIPTION AND OPERATION

1. General

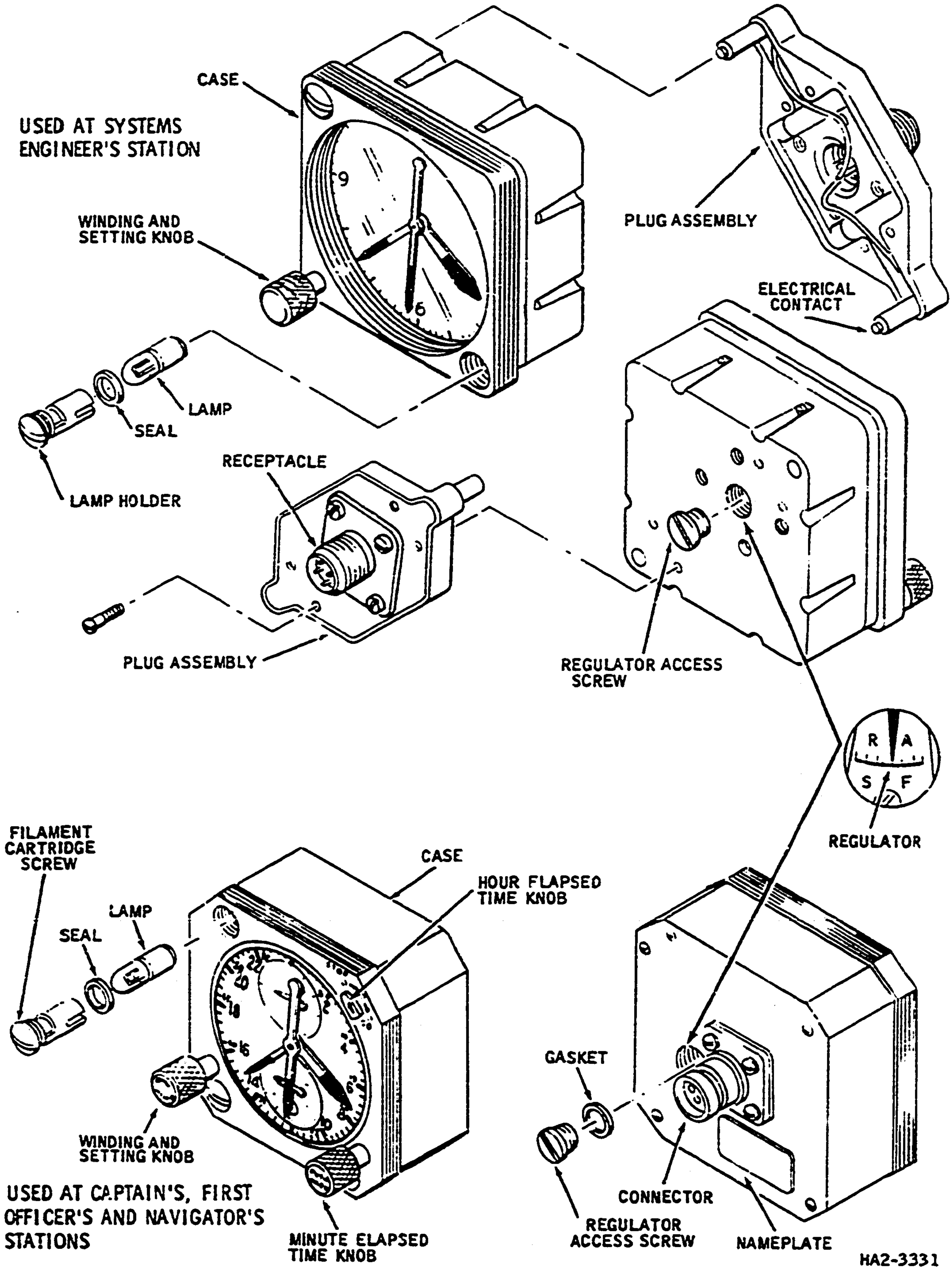
A. There are four clocks installed on the airplane. One clock is installed on the captain's instrument panel, one clock is installed on the first officer's instrument panel, one clock is installed on the systems engineer's control panel (upper section), and one clock is installed on the navigator's/observer's instrument panel.

B. The clock installed on the systems engineer's control panel (upper section) is an 8-day clock with a 12-hour dial. The hands include an hour hand, a minute hand, and a sweep second hand. The clock is set and wound manually. One complete winding is sufficient for a minimum of 8 days of operation. The winding knob, located on the lower left corner of the face, is also used as a setting knob. The knob must be pulled out and rotated to set the hour and minute hands to the correct time. The sweep second hand cannot be reset.

C. Two lamps, installed from the front, provide dial face lighting. The clock is equipped with a receptacle which is used to supply power to the integral lights for dial lighting.

D. The three remaining clocks, installed on the captain's, first officer's, and navigator's/observer's instrument panels, are 8-day elapsed-time clocks. The main dial is calibrated in minutes, numbered with small numerals in increments of 5 to 60 minutes. The dial is also calibrated in hours, numbered with large numerals in increments of 2 to 24 hours. Three hands, an hour hand, a minute hand, and a sweep second hand are used in conjunction with the main dial. A small dial located on the upper half of the clock face is divided into twelve 1-hour increments and is numbered 3, 6, 9, and 12. An hour hand works in conjunction with this dial to measure elapsed time to 12 hours. A similar dial located on the lower half of the clock face is divided into 12 increments numbered by 10 to 60. A minute hand working in conjunction with this dial indicates elapsed time to 60 minutes.

E. The clocks are set and wound manually. One winding is sufficient for a minimum of 8 days of operation. The winding knob, located on the lower left corner of the clock face is also used as a setting knob. The knob must be pulled out and rotated to set the hour and minute hands to the correct time. The sweep second hand cannot be reset. The elapsed-time knob for the minute elapsed-time hand is located on the lower right corner of the clock face. An indicator in the minute elapsed-time dial shows the operating condition. When the indicator is white, the register is not working. Push the knob to start the minute elapsed-time hand and the indicator will appear black. Push the knob a second time to stop the minute elapsed-time hand and the indicator will appear half black and half white. Push the knob a third time to return the hand to zero and the indicator will appear white. The elapsed-time knob for the hour elapsed-hand is located on the upper right corner of the clock face. The knob has



Eight-Day Clock
Figure 1

three placarded positions: stop, 0, and go. Arrows are placarded between each position to indicate the direction of knob rotation.

F. Four integral lamps provide dial face lighting for the elapsed-time clocks. The lamps are front mounted and readily replaced. A receptacle is located on the back of the clocks to supply power to the integral lights for dial lighting.

G. All clocks must be removed from the panel to gain access to the speed-regulating lever. The clocks are mounted on the panel with standard clamp mounts. To regulate the speed of the clocks, remove the regulator access plug and adjust the regulating lever. One division of the dial will alter the clock rate from 1 to 2 minutes per day.

CLOCKS - DESCRIPTION AND OPERATION

1. General

A. There are four clocks installed on the airplane. One clock is installed on the captain's insturment panel, one clock is installed on the first officer's instrument panel, one clock is installed on the systems engineer's control panel, and one clock is installed on the navigator's/observer's instrument panel.

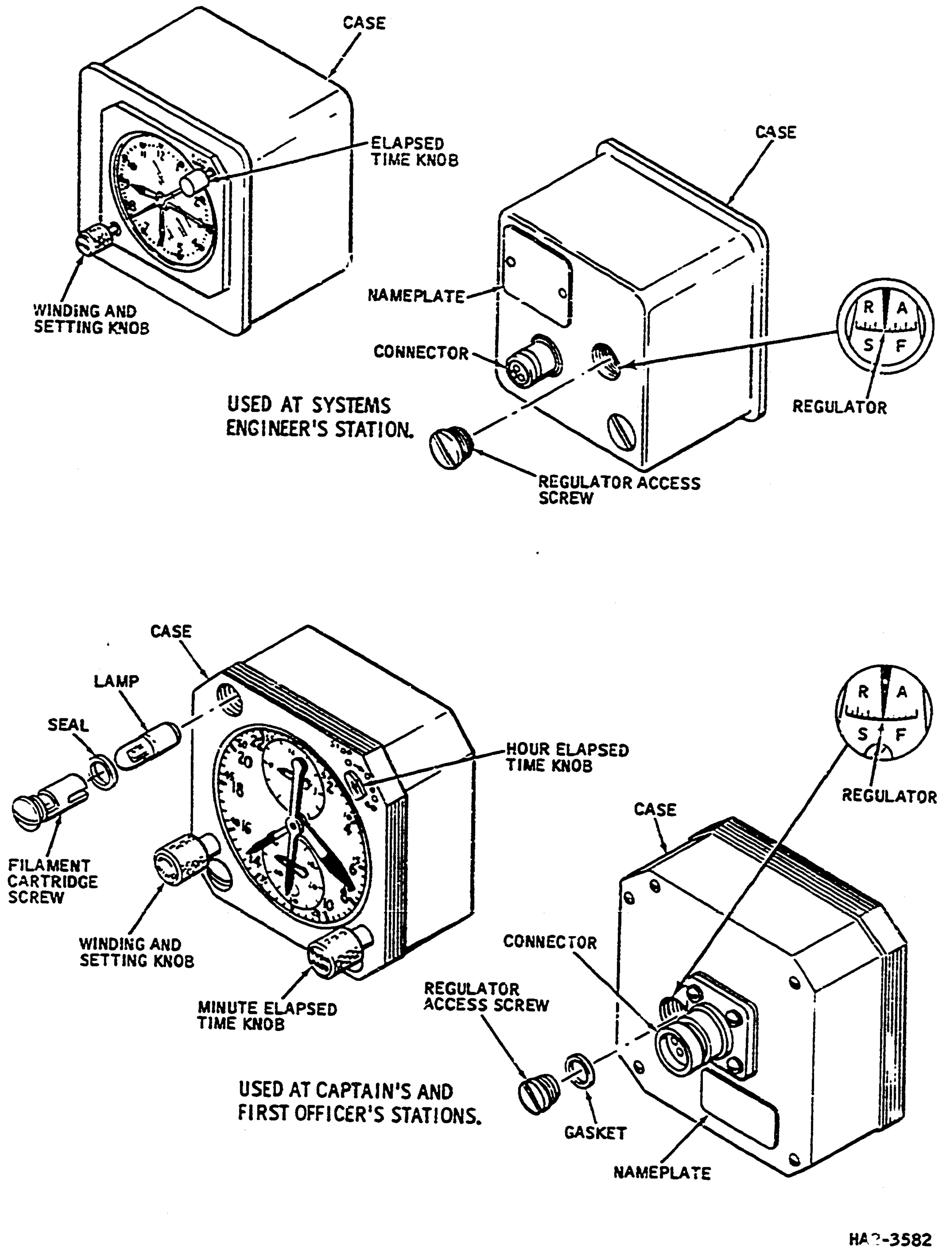
B. The clock installed on the systems ingineer's control panel is an 8-day elapsed-time clock with standard 12-hour dial. Four hands operate from the center of the dial on concetric shafts. The hands include an hour hand, a minute hand, and a sweep-second hand. The fourth hand has a unique arrowhead tip and is used to indicate elapsed time to 12 minutes.

C. The clock is set and wound manually. One winding is sufficient for a minimum of 8 days of operation. The winding knob, located on the lower left corner of the face, is also used as a setting knob. The knob must be pulled out and rotated to set the hour and minute-hands to the correct time. The sweep-second hand cannot be reset. The elapsed-time knob is located on the upper right corner of the face. The knob is pushed to start the elapsed-time hand, pushed a second time to stop the elapsed-time hand, and pushed a third time to return the hand to zero hours.

D. Four integral lamps provide dial face lighting for the systems engineer's clock. The clock must be removed from the panel and opened to replace burned out lamps. A receptacle is located on the back of the clock to supply power to the integral lights for dial lighting.

E. The three remaining clocks, installed on the captain's, first officer's, and navigator's/observer's instrument panels, are 8-day elapsed-time clocks. The main dial is calibrated in minutes, numbered with small numerals in increments of 5 to 60 minutes. The dial is also calibrated in hours, numbered with large numerals in increments of 2 to 24 hours. Three hands, an hour hand, a minute hand, and a sweep-second hand are used in conjunction with the main dial. A small dial located on the upper half of the clock face is divided into twelve 1-hour increments and is numbered 3, 6, 9, and 12. An hour hand works in conjunction with this dial to measure elapsed time to 12 hours. A similar dial located on the lower half of the clock face is divided into 12 increments numbered by 10 to 60. A minute hand working in conjunction with this dial indicated elapsed time to 60 minutes.

F. The clocks are set and wound manually. One winding is sufficient for a minimum of 8 days of operation. The winding knob, located on the lower left corner of the clock face is also used as a setting knob. The knob must be pulled out and rotated to set the hour and minute hands to the correct time. The sweep-second hand cannot be reset. The elapsed-time



Eight-Day Clock
Figure 1

Printed in U.S.A.

hand is located on the lower right corner of the clock face. An indicator in the minute elapsed-time dial shows the operating condition. When the indicator is white, the register is not working. Push the knob to start the minute elapsed-time hand and the indicator will appear black. Push the knob a second time to stop the minute elapsed-time hand and the indicator will appear half black and half white. Push the knob a third time to return the hand to zero and the indicator will appear white. The elapsed-time knob for the hour elapsed-hand is located on the upper right corner of the clock face. The knob has three placarded positions: stop, 0, and go. Arrows are placarded between each position to indicate the direction of knob rotation.

G. Four integral lamps provide dial face lighting for the captain's, first officer's and navigator's clocks. The lamps are front mounted and readily replaced. A receptacle is located on the back of the clocks to supply power to the integral lights for dial lighting.

H. All clocks must be removed from the panel to gain access to the speed-regulating lever. The clocks are mounted on the panel with standard clamp mounts. To regulate the speed of the clocks, remove the regulator access plug and adjust the regulating lever. One division of the dial will alter the clock rate from 1 to 2 minutes per day.

CLOCKS - DESCRIPTION AND OPERATION

1. General

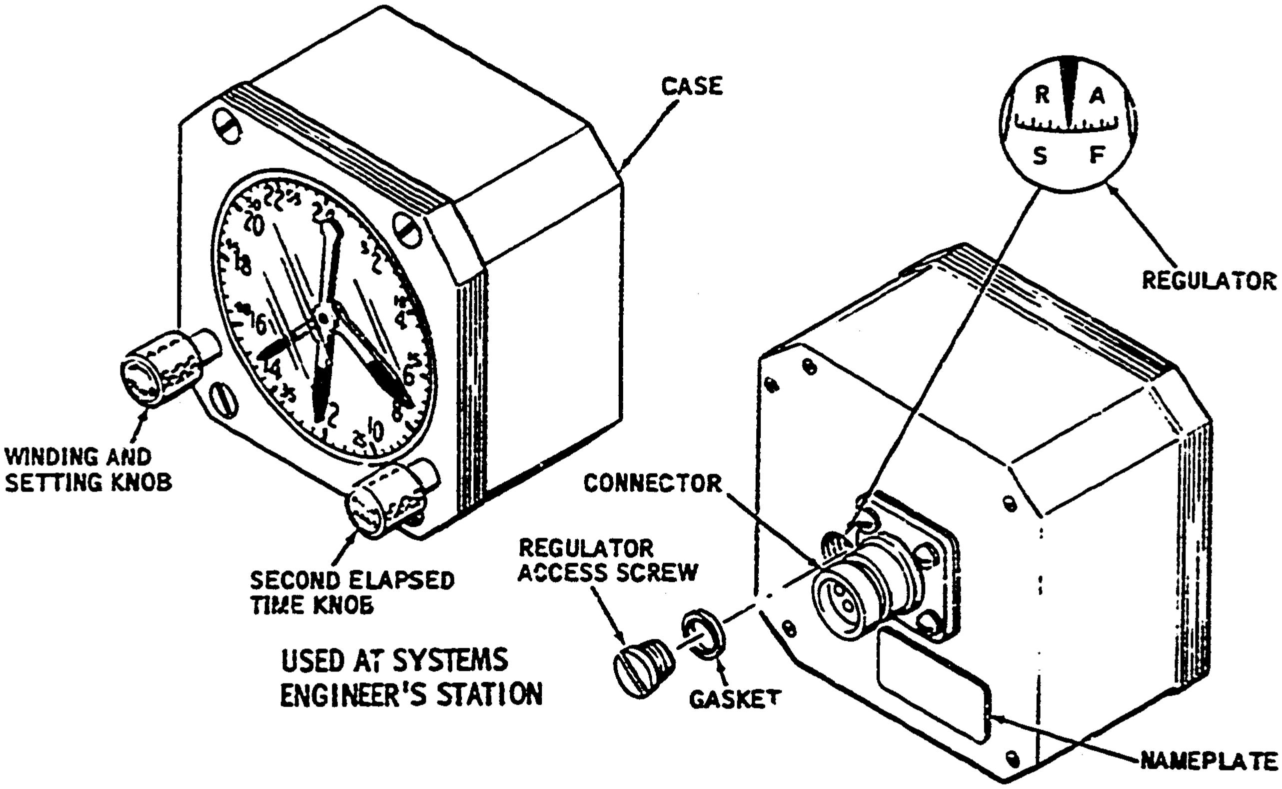
A. There are three clocks installed on the airplane. One clock is installed on the captain's flight instrument panel, one clock is installed on the first officer's flight instrument panel, and one clock is installed on the systems engineer's control panel (center section).

B. The clocks on the captain's and first officer's panels are 8-day clocks with 12-hour dials. The hands include an hour hand, a minute hand, and a sweep-second hand. The clocks are set and wound manually. One complete winding is sufficient for a minimum of 8 days of operation. The setting knob, on the lower left corner of the face, permits hour and minute hand settings; the sweep-second hand cannot be reset.

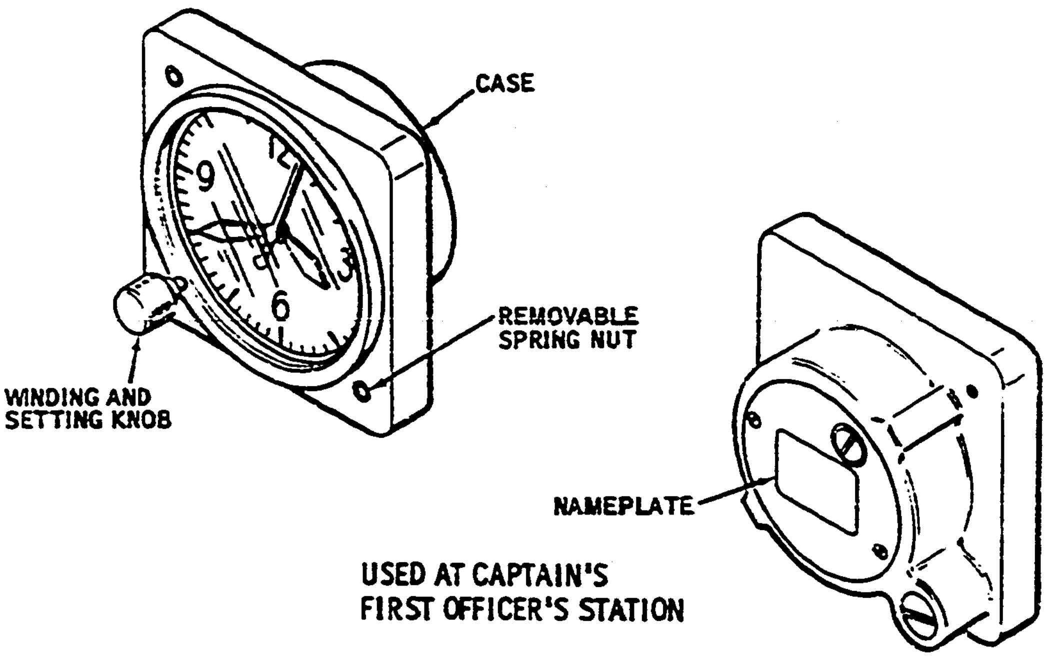
C. The systems engineer's clock is an 8-day clock with 24-hour dial. The hands include an hour hand, a minute hand, and a sweep-second hand. The clock is set and wound manually. One complete winding is sufficient for a minimum of 8 days of operation. The setting knob, on the lower left corner of the face, permits hour and minute hand settings; the sweep-second hand cannot be reset. The second elapsed time knob is located on the lower right corner of the face. The knob is pushed to start the second hand, pushed a second time to stop the second hand, and pushed a third time to return the hand to zero seconds.

D. Four lamps, installed from the fromt, provide dial face lighting for the systems engineer's clock. The clock is equipped with a receptacle which is used to supply power to the integral lights for dial lighting.

E. All clocks must be removed from the panel to gain access to the speed-regulating lever The clocks are mounted on the panel with standard clamp mounts. To regulate the speed of the clocks, remove the regulator access screw and adjust the regulating lever. One division of the dial will alter the clock rate from 1 to 2 minutes per day.



USED AT SYSTEMS
ENGINEER'S STATION



USED AT CAPTAIN'S
FIRST OFFICER'S STATION

HA2-3646

CLOCKS - DESCRIPTION AND OPERATION

1. General

A. There are three clocks installed on the airplane. One clock is installed on the captain's instrument panel; one clock is installed on the first officer's instrument panel, and one clock is installed on the navigator's/observer's instrument panel.

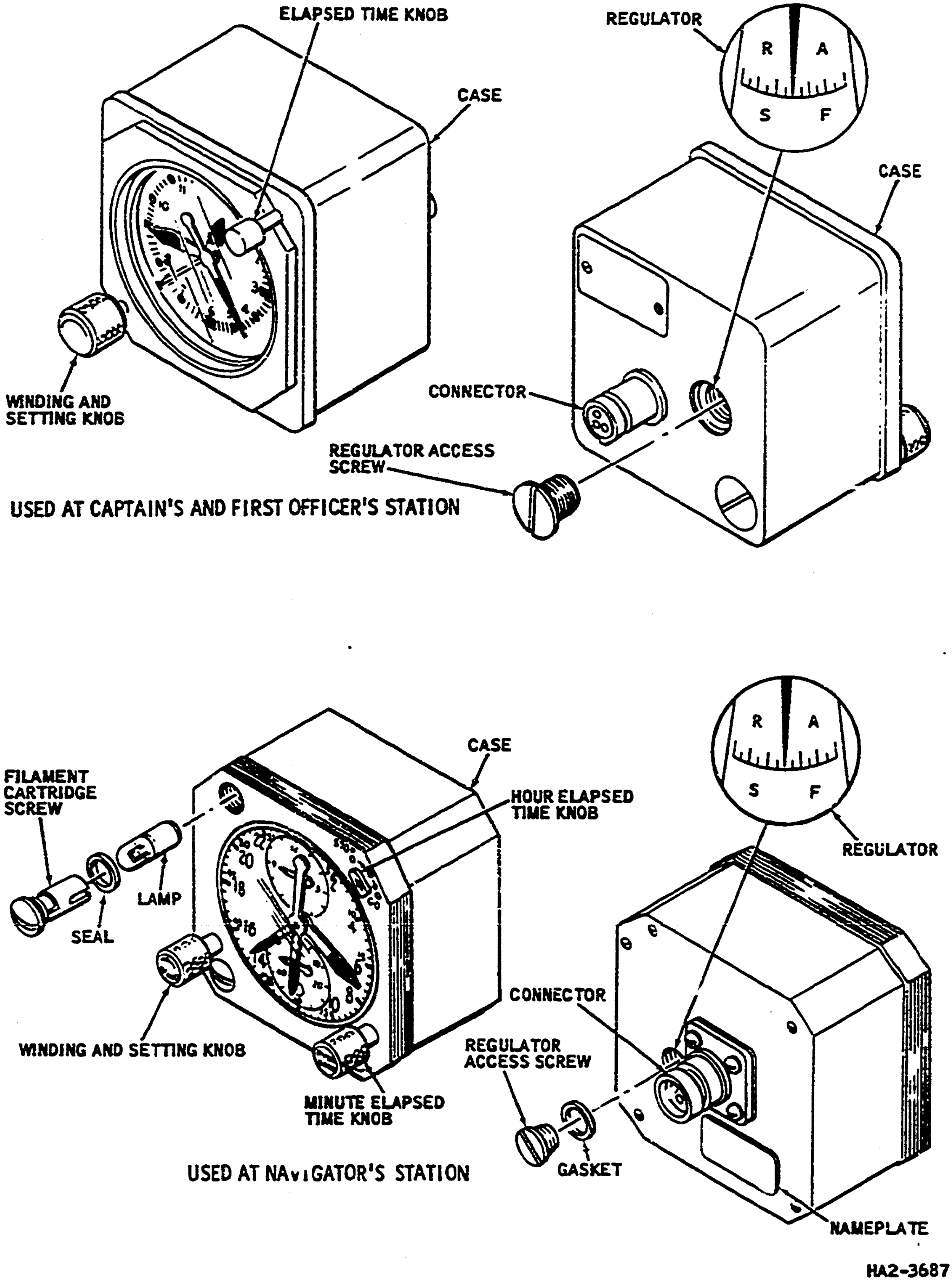
B. The clocks installed on the captain's and first officer's panels are 8-day elapsed-time clocks with 12-hour dials. Four hands operate from the center of the dial on concentric shafts. The hands include an hour hand, a minute hand, and a sweep-second hand. The fourth hand has a unique arrowhead tip and is used to indicate elapsed time to 12 minutes.

C. The clocks are set and wound manually. One winding is sufficient for a minimum of 8 days of operation. The winding knob, located on the lower left corner of the face, is also used as a setting knob. The knob must be pulled out and rotated to set the hour and minute hands to the correct time. The sweep-second hand cannot be reset. The elapsed-time knob is located on the upper right corner of the face. The knob is pushed to start the elapsed-time hand, pushed a second time to stop the elapsed-time hand, and pushed a third time to return the hand to zero hours.

D. Four integral lamps provide dial face lighting for the captain's and first officer's clocks. The clocks must be removed from the panel and opened to replace burned out lamps. A receptacle is located on the back of the clock to supply power to the integral lights for dial lighting.

E. The clock, installed on the navigator's/observer's instrument panel, is an 8-day elapsed-time clock. The main dial is calibrated in minutes, numbered with small numerals in increments of 5 to 60 minutes. The dial is also calibrated in hours, numbered with large numerals in increments of 2 to 24 hours. Three hands, an hour hand, a minute hand, and a sweep-second hand are used in conjunction with the main dial. A small dial located on the upper half of the clock face is divided into twelve 1-hour increments and is numbered 3, 6, 9, and 12. An hour hand works in conjunction with this dial to measure elapsed time to 12 hours. A similar dial located on the lower half of the clock face is divided into 12 increments numbered by 10 to 60. A minute hand working in conjunction with this dial indicates elapsed time to 60 minutes.

F. The navigator's clock is set and wound manually. One winding is sufficient for a minimum of 8 days of operation. The winding knob, located on the lower left corner of the clock face, is also used as a setting knob. The knob must be pulled out and rotated to set the hour and minute hands to the correct time. The sweep-second hand cannot be reset. The elapsed-time knob for the minute elapsed-time hand is located on the lower right corner of the clock face. An indicator in the minute elapsed-time dial



Eight-Day Clock
Figure 1

shows the operating condition. When the indicator is white, the register is not working. Push the knob to start the minute elapsed-time hand and the indicator will appear black. Push the knob a second time to stop the minute elapsed-time hand and the indicator will appear half black and half white. Push the knob a third time to return the hand to zero and the indicator will appear white. The elapsed-time knob for the hour elapsed-time hand is located on the upper right corner of the clock face. The knob has three placarded positions: stop, 0, and go. Arrows are placarded between each position to indicate the direction of knob rotation.

G. Four integral lamps provide dial face lighting for the elapsed-time clocks. The lamps are front mounted and readily replaced. A receptacle is located on the back of the clocks to supply power to the integral lights for dial lighting.

H. All clocks must be removed from the panel to gain access to the speed-regulating lever. The clocks are mounted on the panel with standard clamp mounts. To regulate the speed of the clocks, remove the regulator access plug and adjust the regulating lever. One division of the dial will alter the clock rate from 1 to 2 minutes per day.

CLOCKS - DESCRIPTION AND OPERATION

1. General

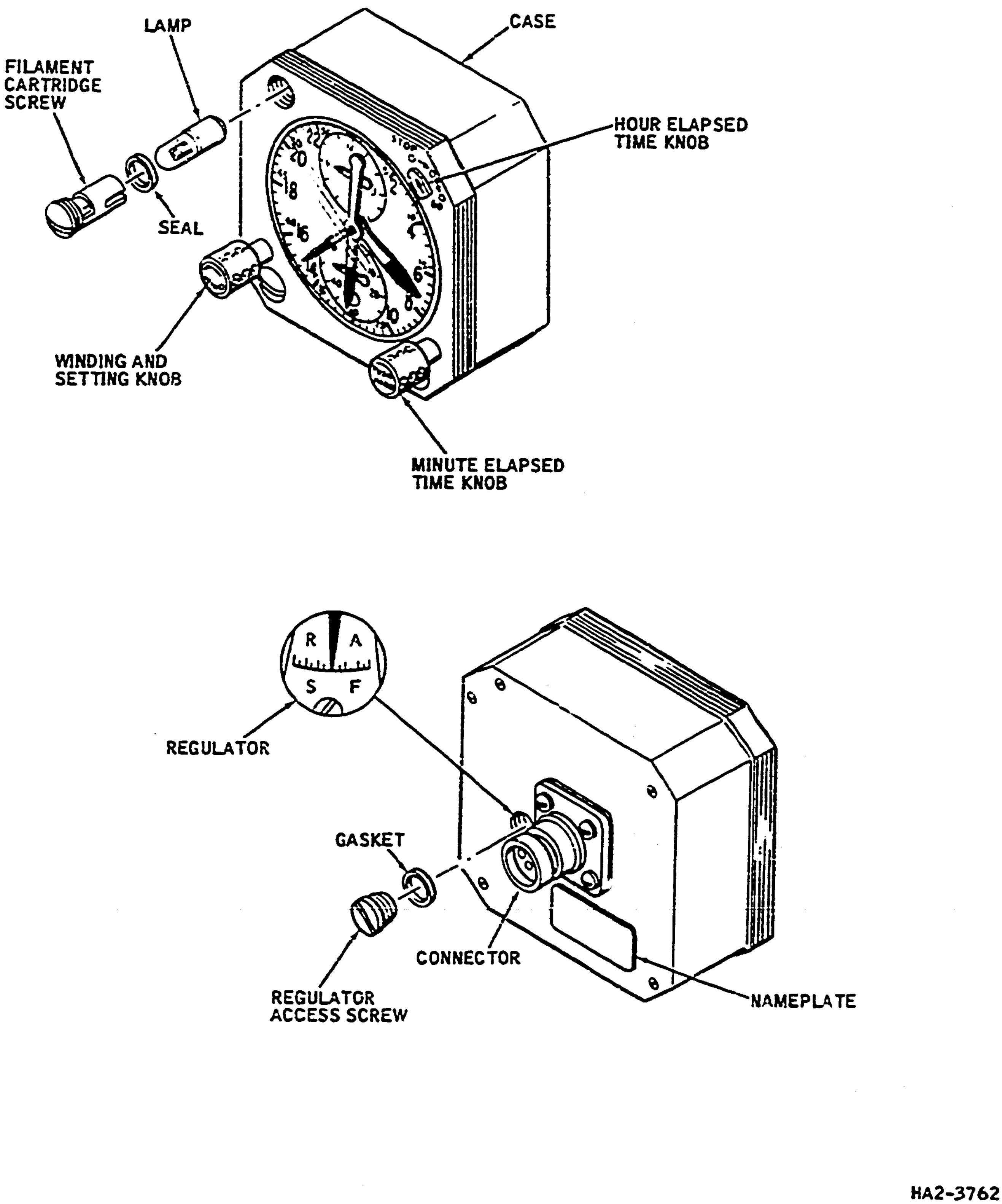
A. There are three clocks installed on the airplane. One clock is installed on the captain's instrument panel, one clock is installed on the first officer's instrument panel, and one clock is installed on the navigator's/observer's instrument panel.

B. The clocks are 8-day elapsed-time clocks. The main dial is calibrated in minutes, numbered with small numerals in increments of 5 to 60 minutes. The dial is also calibrated in hours, numbered with large numerals in increments of 2 to 24 hours. Three hands, an hour hand, a minute hand, and a sweep-second hand are used in conjunction with the main dial. A small dial located on the upper half of the clock face is divided into twelve 1-hour increments and is numbered 3, 6, 9, and 12. An hour hand works in conjunction with this dial to measure elapsed time to 12 hours. A similar dial located on the lower half of the clock face is divided into 12 increments numbered by 10 to 60. A minute hand working in conjunction with this dial indicates elapsed time to 60 minutes.

C. The clocks are set and wound manually. One winding is sufficient for a minimum of 8 days of operation. The winding knob, located on the lower left corner of the clock face is also used as a setting knob. The knob must be pulled out and rotated to set the hour and minute hands to the correct time. The sweep-second hand cannot be reset. The elapsed-time knob for the minute elapsed-time hand is located on the lower right corner of the clock face. An indicator in the minute elapsed-time dial shows the operating condition. When the indicator is white, the register is not working. Push the knob to start the minute elapsed-time hand and the indicator will appear black. Push the knob a second time to stop the minute elapsed time hand and the indicator will appear half black and half white. Push the knob a third time to return the hand to zero and the indicator will appear white. The elapsed-time knob for the hour elapsed-hand is located on the upper right corner of the clock face. The knob has three placarded positions: stop, 0, and go. Arrows are placarded between each position to indicate the direction of knob rotation.

D. Four integral lamps provide dial face lighting for the elapsed-time clocks. The lamps are front mounted and readily replaced. A receptacle is located on the back of the clocks to supply power to the integral lights for dial lighting.

E. All clocks must be removed from the panel to gain access to the speed-regulating lever. The clocks are mounted on the panel with standard clamp mounts. To regulate the speed of the clocks, remove the regulator access plug and adjust the regulating lever. One division of the dial will alter the clock rate from 1 to 2 minutes per day.



Eight-Day Clock
Figure 1

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CLOCKS - DESCRIPTION AND OPERATION

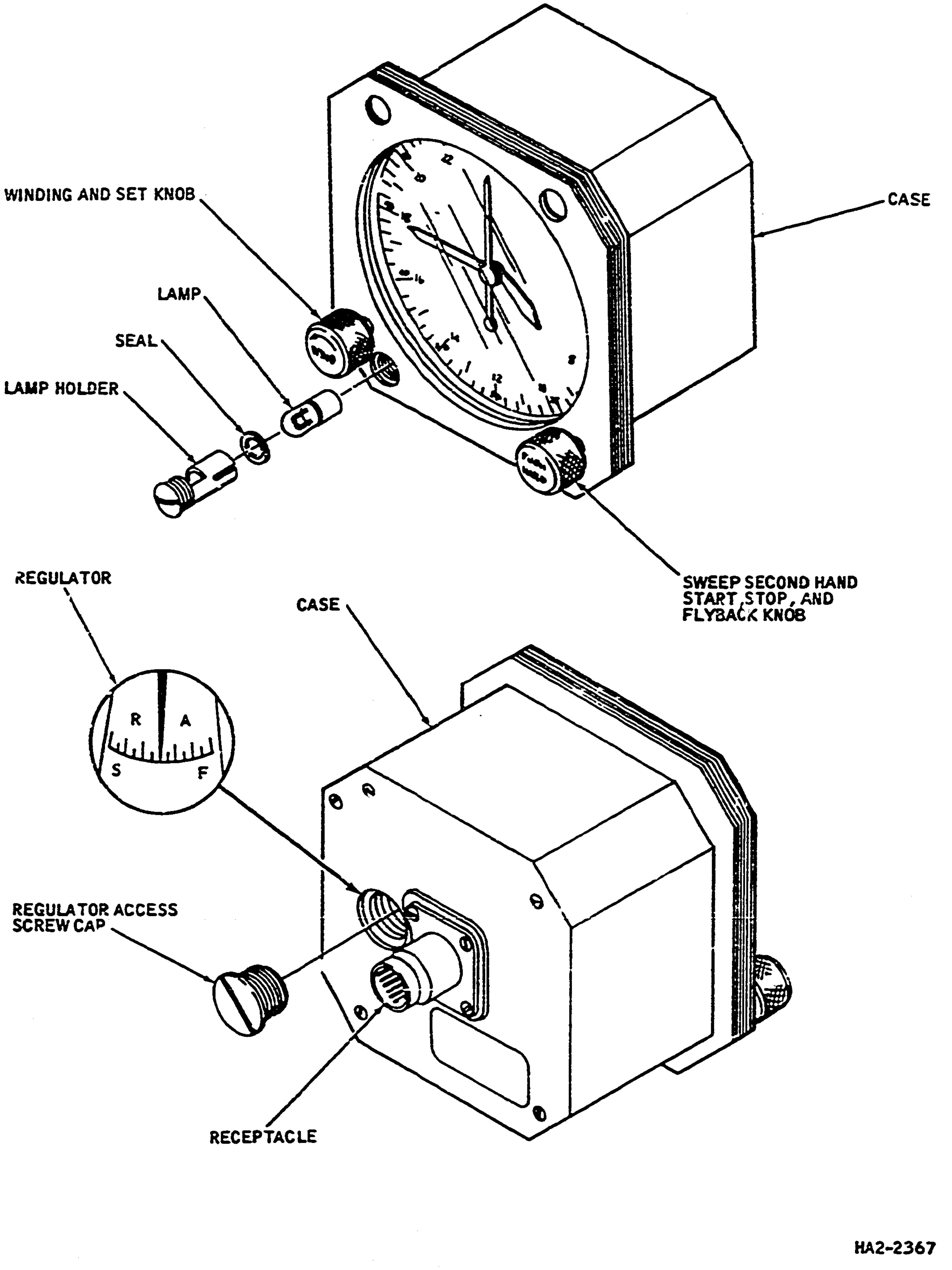
1. General

   A. There are three clocks installed on the airplane. One clock is installed on the captain's flight instrument panel, one clock is installed on the first officer's flight instrument panel, and one clock is installed on the navigator's/observer's instrument panel.

   B. The clocks are 8-day clocks with 24-hour dials. The hands include an hour hand, a minute hand, and a sweep-second hand. The clocks are set and wound manually. One complete winding is sufficient for a minimum of 8 days of operation. The setting knob, on the lower right corner of the face, permits hour and minute hand settings; the sweep-second hand cannot be reset.

   C. Four lamps, installed from the front, provide dial face lighting. The clock is equipped with a receptacle which is used to supply power to the integral lights for dial lighting.

   D. The clocks must be removed from the panel to gain access to the speed-requlating lever. The clocks are mounted on the panel with standard clamp mounts. To regulate the speed of the clocks, remove the regulator access screw and adjust the regulating lever. One division of the dial will alter the clock rate from 1 to 2 minutes per day.



Eight-Day Clock
Figure 1

CLOCKS - DESCRIPTION AND OPERATION

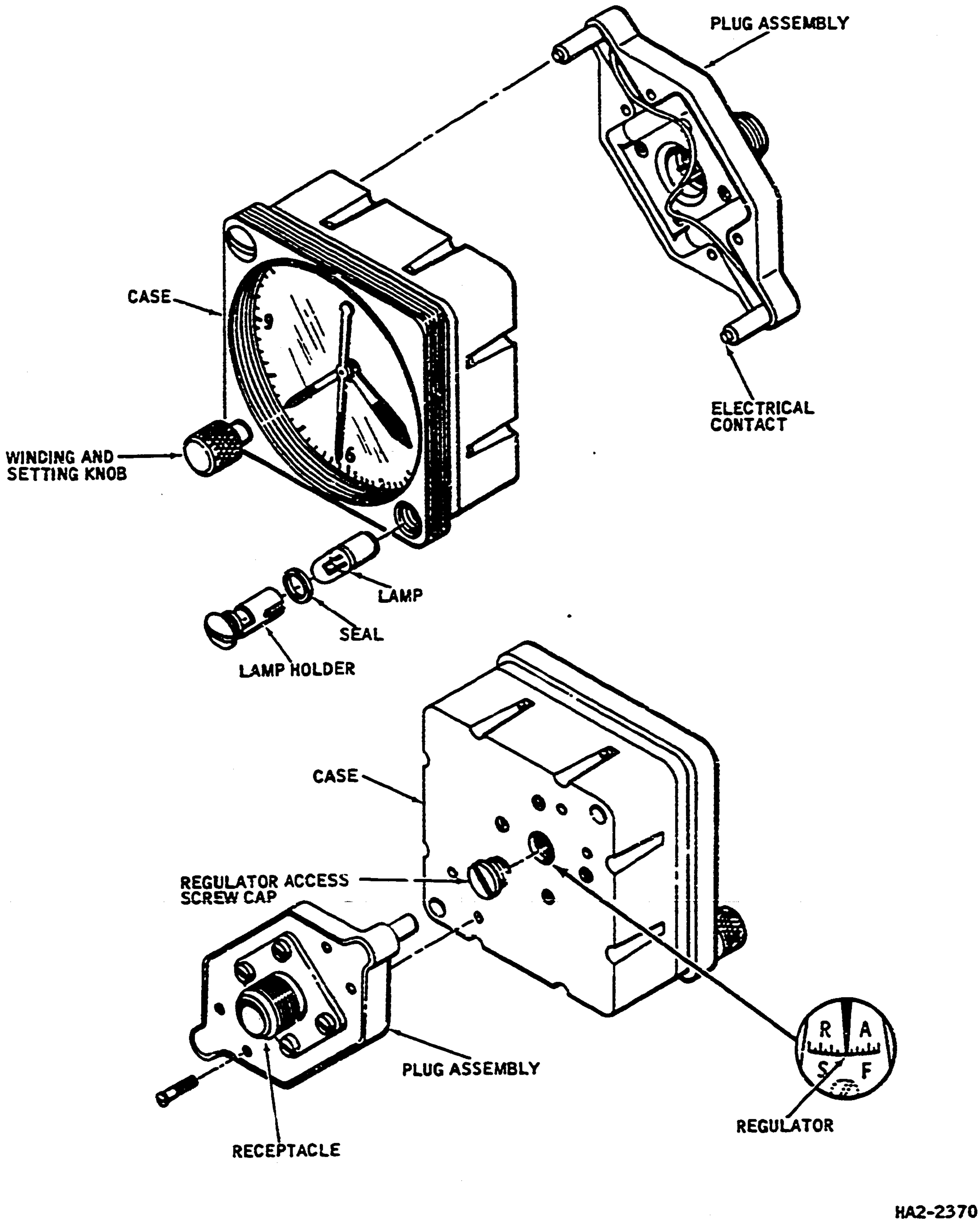
1. General

A. There are three clocks installed on the airplane. One clock is installed on the captain's flight instrument panel, one clock is installed on the first officer's flight instrument panel, and one clock is installed on the systems engineer's control panel.

B. The clocks are 8-day clocks with 12-hour dials. The hands include an hour hand, a minute hand, and a sweep-second hand. The clocks are set and wound manually. One complete winding is sufficient for a minimum of 8 days of operation. The winding knob, located on the lower left corner of the face, is also used as a setting knob. The knob must be pulled out and rotated to set the hour and minute hands to the correct time. The sweep-second hand cannot be reset.

C. Two lamps, installed from the front, provide dial face lighting. The clock is equipped with a receptacle which is used to supply power to the integral lights for dial lighting.

D. The clocks must be removed from the panel to gain access to the speed-regulating lever. The clocks are mounted on the panel with standard clamp mounts. To regulate the speed of the clocks, remove the regulator access screw and adjust the regulating lever. One division of the dial will alter the clock rate from 1 to 2 minutes per day.



Eight-Day Clock
Figure 1

CLOCKS - DESCRIPTION AND OPERATION

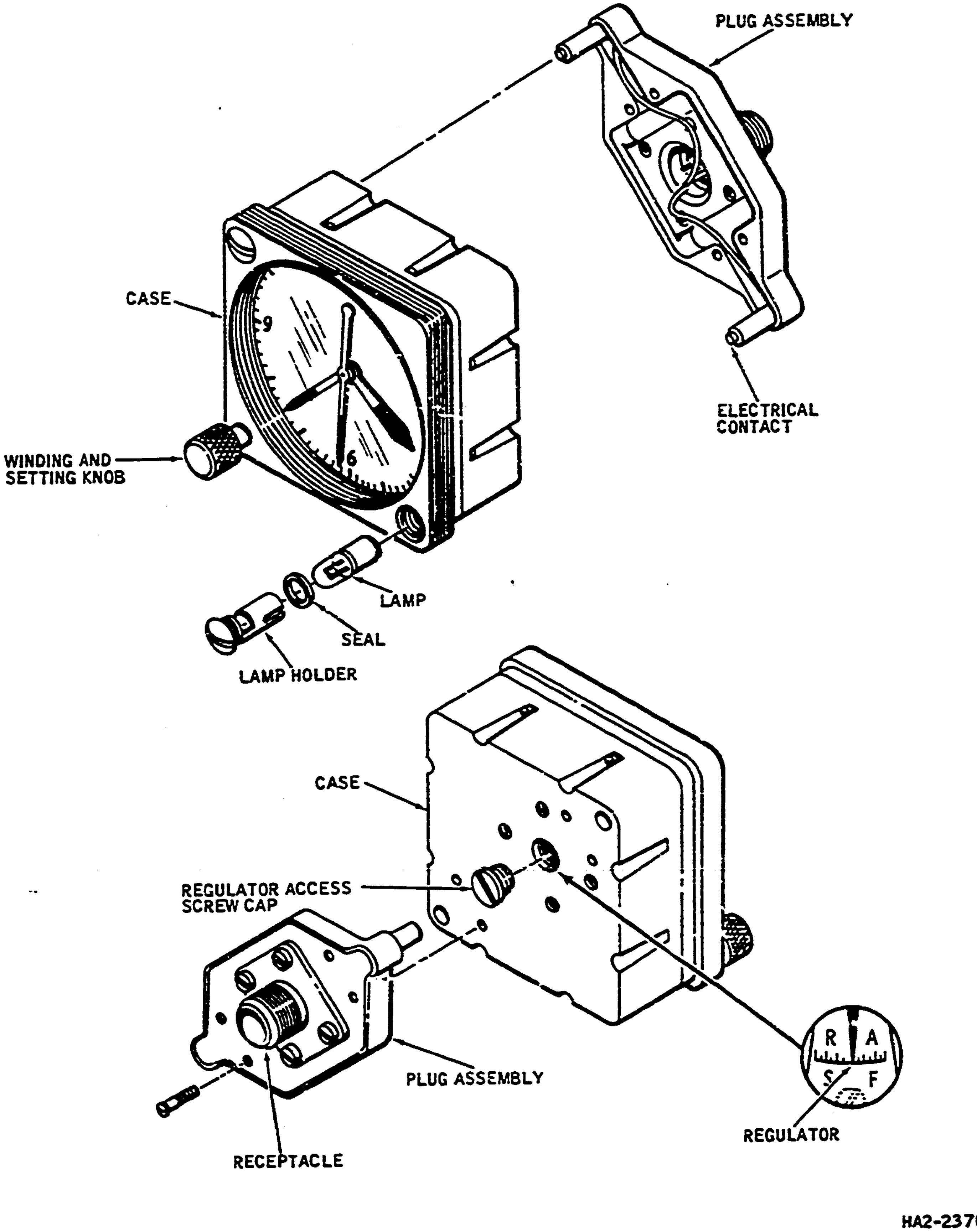
1. General

A. There are three clocks installed on the airplane. One clock is installed on the captain's flight instrument panel, one clock is installed on the first officer's flight instrument panel, and one clock is installed on the navigator's/observer's instrument panel.

B. The clocks are 8-day clocks with 12-hour dials. The hands include an hour hand, a minute hand, and a sweep-second hand. The clocks are set and wound manually. One complete winding is sufficient for a minimum of 8 days of operation. The winding knob, located on the lower left corner of the face is also used as a setting knob. The knob must be pulled out and rotated to set the hour and minute hands to the correct time. The sweep-second hand cannot be reset.

C. Two lamps, installed from the front, provide dial face lighting. The clock is equipped with a receptacle which is used to supply power to the integral lights for dial lighting.

D. The clocks must be removed from the panel to gain access to the speed-regulating lever. The clocks are mounted on the panel with standard clamp mounts. To regulate the speed of the clocks, remove the regulator access screw and adjust the regulating lever. One division of the dial will alter the clock rate from 1 to 2 minutes per day.



Eight-Day Clock
Figure 1

Printed in U.S.A.

CLOCKS - DESCRIPTION AND OPERATION

1. General

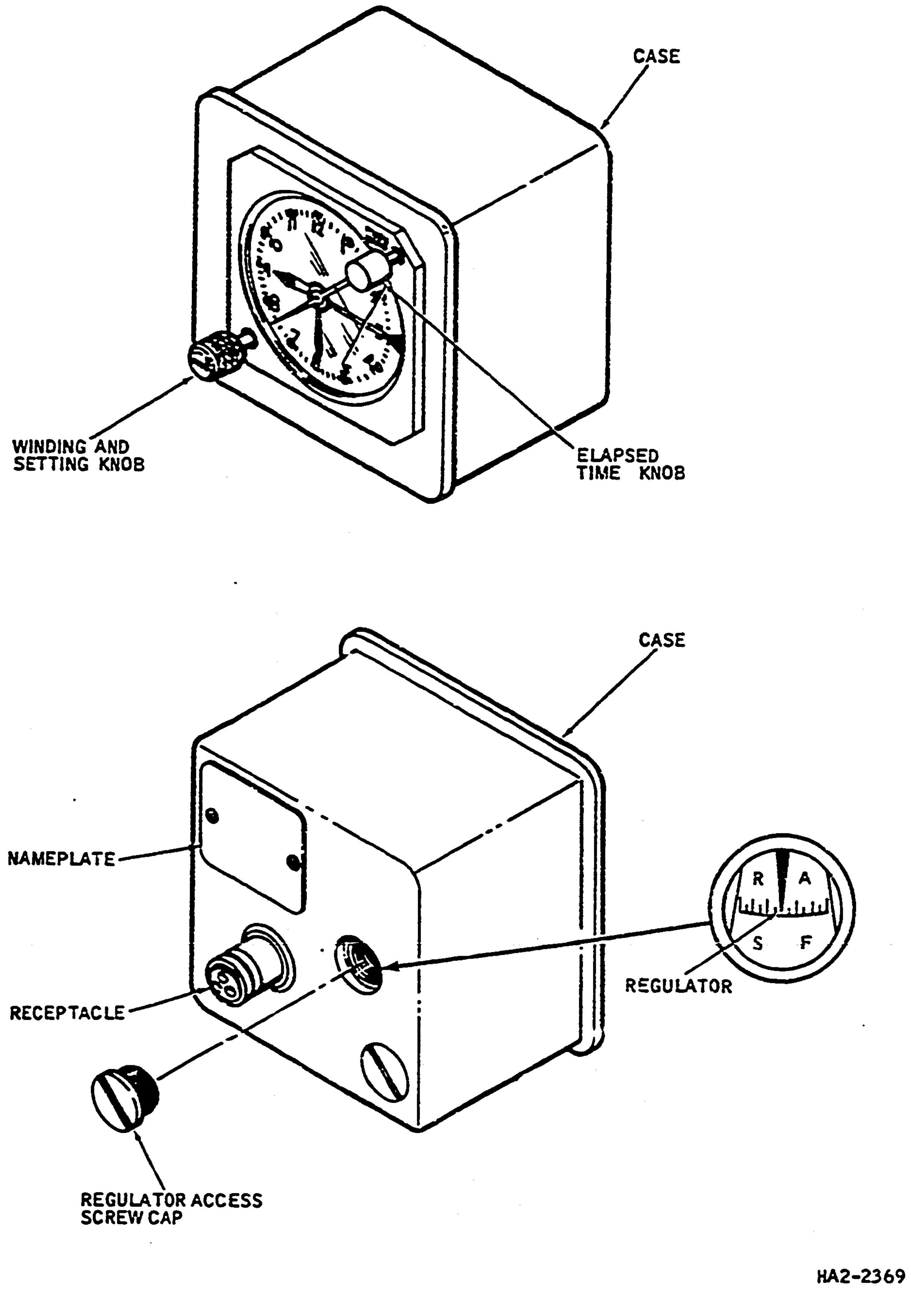
A. There are four clocks installed on the airplane. One clock is installed on the captain's flight gusset panel, one clock is installed on the first officer's flight gusset panel, one clock is installed on the systems engineer's control panel (upper section) and one clock is installed on the navigator's/observer's panel.

B. The clocks are 8-day elapsed-time clocks with standard 12-hour dials. Four hands operate from the center of the dial on concentric shafts. The hands include an hour hand, a minute hand, and a sweep second hand. The fourth hand has a unique arrowhead tip and is used to indicate elapsed time to 12 minutes.

C. The clocks are set and wound manually. One winding is sufficient for a minimum of 8 days of operation. The winding knob, located on the lower left corner of the face, is also used as a setting knob. The knob must be pulled out and rotated to set the hour and minute hands to the correct time. The sweep second hand cannot be reset. The elapsed-time knob is located on the upper right corner of the face. The knob is pushed to start the elapsed-time hand, pushed a second time to stop the elapsed-time hand, and pushed a third time to return the hand to zero hours.

D. Four integral lamps provide dial face lighting. The clock must be removed from the panel and opened to replace burned out lamps. A receptacle is located on the back of the clock to supply power to the integral lights for dial lighting.

E. The clocks must be removed from the panel to gain access to the speed-regulating lever. The clocks are mounted on the panel with standard clamp mounts. To regulate the speed of the clocks, remove the regulator access plug and adjust the regulating lever. One division of the dial will alter the clock rate from 1 to 2 minutes per day.



Eight-Day Clock
Figure 1

FLIGHT RECORDER SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The flight recorder system is an airborne recorder which maintains a permanent, inflight record of altitude, indicated airspeed, heading, and vertical acceleration with respect to time. The records are oscillographic and are made by engraving a line on a metal recording medium. In addition to the four major records, trip and date information is recorded and inputs from the VHF-1 and VHF-2 communications systems indicate when a microphone push-to-talk switch has been pushed.

B. The flight recorder system consists of a flight recorder unit, an acceleration sensor, a power failure warning light, a pitot source, a static source, inputs from the VHF-1 and VHF-2 communications systems, and a trip and date encoder.

C. The flight recorder unit with tape motion sensor is installed on the inboard radio rack on shelf 5. The unit is calibrated to record altitudes up to 50,000 feet and vertical accelerations from -3g's to +6g's. Heading information is supplied to the recorder from an output synchro in the gyro-compass indicator. Pitot pressure is supplied to the recorder from the tail pitot system. Static pressure is supplied from the alternate static system. The inputs from the VHF-1 and VHF-2 communications systems are taken directly from the microphone push-to-talk switches.

D. All data is recorded on a metal recording medium. The medium moves uniformly at a rate of 6 inches per hour and sufficient recording medium is on each spool to record 300 total hours on each side. The medium is fireproof, waterproof, and able to withstand severe shocks and vibration. If unusual flight conditions are encountered, information from the flight recording medium may be used to facilitate inspection procedures.

E. The acceleration sensor is mounted in the left main wheelwell near the airplane center of gravity. It is a sealed component which delivers an electrical signal proportional to the forces along its vertical axis. The unit is calibrated to provide signals which are proportional to forces from -3g's to +6g's.

F. A power failure warning light is located on the systems engineer's control panel and indicates a system power failure, a broken foil, or an exhausted recording magazine.

G. A trip date encoder is installed on the system engineer's control panel (upper frame) and records the trip number and date as a coded series of pulses near the edge of the recording medium. Four thumb switches are used to set in the trip information and two thumb switches are used to set in the date information. An indicator, located on the right side of

the face of the encoder, displays the number of hours remaining for the recording medium. A red event button underneath the indicator is used to mark an encoding pulse on the recording medium to indicate the occurrence of some special event. A black repeat button underneath the indicator is used to repeat the encoding cycle. An amber indicating light between the repeat and event buttons shows that the encoding cycle is in progress. The light goes off when the encoding cycle is completed.

H. The system receives 115-volt, 400-cycle ac power from the flight recorder circuit breaker on the right ac emergency bus. The system receives 28-volt dc power from the flight recorder circuit breaker on the right dc emergency bus. The system is always energized in flight due to the action of a ground control relay. A switch is provided on the systems engineer's control panel to bypass the ground control relay and supply power to the system on the ground.

I. The tape motion sensor provides a time delay margin of safety against false indications. The sensor actuates a relay at the end of a 2-minute delay period to reset and start the cycle from the beginning.

2. To Operate System

A. To Operate System for Flight

(1) Energize buses.

(2) Place flight recorder on-off switch in on position.

(3) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(4) Set encoder thumbwheel switches to proper trip and date information.

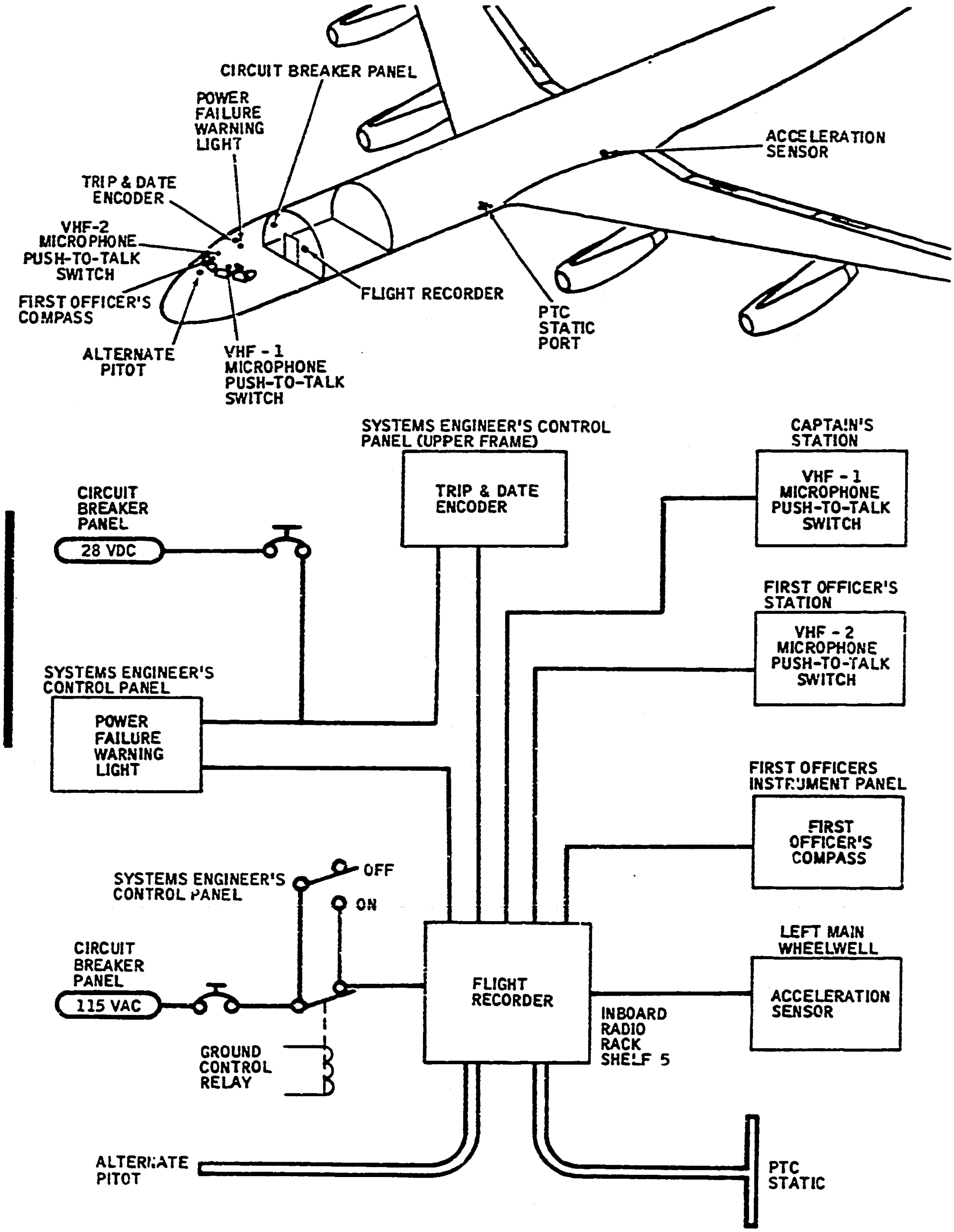
(5) Press repeat button on trip and date encoder. Small neon light directly below time remaining indicator should come on and remain on for duration of encoding cycle.

(6) Upon completion of encoding cycle, on-off switch can be placed in off position to conserve recording medium. Power is automatically applied to system upon actuation of ground control relay when airplane leaves runway.

B. To Operate System on Ground

(1) Energize buses.

(2) Place flight recorder on-off switch in on position.



Flight Recorder System -- Block Diagram
Figure 1

(3) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(4) Set encoder thumbwheel switches to desired trip and date information.

(5) Press repeat button on trip and date encoder. Small neon light directly below time remaining indicator should come on and remain on for duration of encoding cycle.

(6) Press event button to indicate occurrence of event on recording medium.

<u>NOTE</u>: System will operate until on-off switch is placed in off position or until power is removed from buses.

FLIGHT RECORDER SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The flight recorder system is an airborne recorder which maintains a permanent, inflight record of altitude, indicated airspeed, heading, and vertical acceleration with respect to time. The records are oscillographic and are made by engraving a line on a metal recording medium. In addition to the four major records, trip and date information is recorded.

B. The flight recorder system consists of a flight recorder unit with tape motion sensor, an acceleration sensor, a power failure warning light, a pitot source, a static source, and a trip and date encoder.

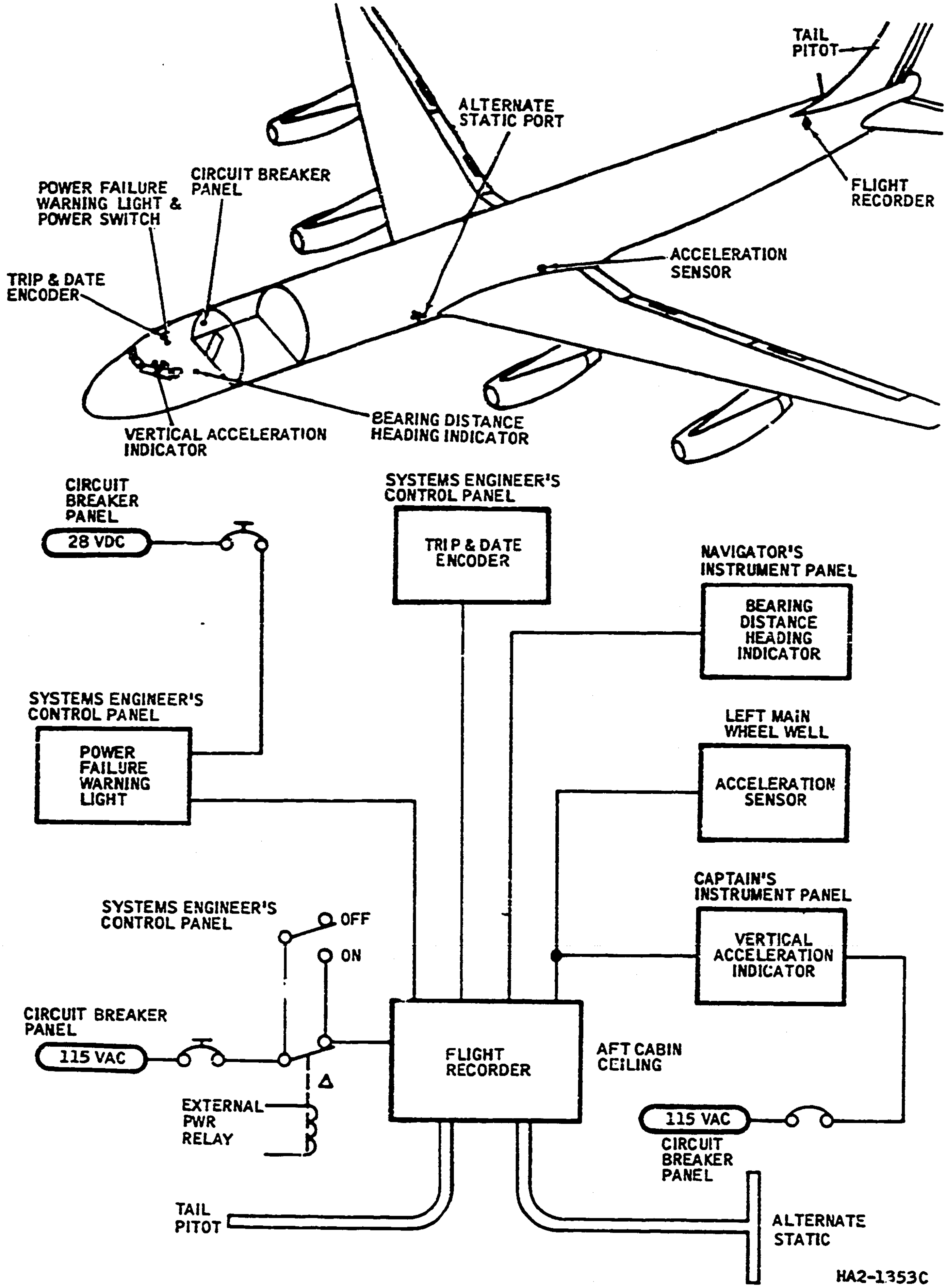
C. The flight recorder unit is installed above the aft cabin ceiling. The unit is calibrated to record altitudes up to 50,000 feet and vertical accelerations from -3g's to +6g's. Heading information is supplied to the recorder from an output synchro in the gyro compass indicator. Pitot pressure is supplied to the recorder from the tail pitot system. Static pressure is supplied from the alternate static system.

D. All data is recorded on a metal recording medium. The medium moves uniformly at a rate of 6 inches per hour and sufficient recording medium is on each spool to record 400 total hours on each side. The medium is fireproof, waterproof, and able to withstand severe shocks and vibration. If unusual flight conditions are encountered, information from the flight recording medium may be used to facilitate inspection procedures.

E. The acceleration sensor is mounted in the left main wheelwell near the airplane center of gravity. It is a sealed component which delivers an electrical signal proportional to the forces along its vertical axis. The unit is calibrated to provide signals which are proportional to forces from -3g's to +6g's.

F. A power failure warning light is located on the systems engineer's control panel and indicates a system power failure, a broken foil, or an exhausted recording magazine.

G. A trip and date encoder is installed on the systems engineer's control panel (upper section) and records the trip number and date as a coded series of pulses near the edge of the recording medium. Four thumb switches are used to set in the trip information and two thumb switches are used to set in the date information. An indicator, located on the right side of the face of the encoder, displays the number of hours remaining for the recording medium. A red event button above the indicator is used to mark an encoding pulse on the recording medium to indicate the occurrence of some special event. A black repeat button above the indicator is used to repeat the encoding cycle. An amber indicating light above the indicator shows that the encoding cycle is in progress. The light goes off when the encoding cycle is completed.



Flight Recorder System -- Block Diagram
Figure 1

H. The system receives 115-volt, 400-cycle ac power from the flight recorder circuit breaker on the right ac emergency bus and radio bus 3. The system receives 28-volt dc power from the flight recorder circuit breaker on the right dc emergency bus. The system is always energized in flight due to the action of an external power relay. A switch is provided on the systems engineer's control panel to bypass the external power relay and supply power to the system on the ground.

I. The tape motion sensor provides a time delay margin of safety against false indications. The sensor actuates a relay at the end of a 2-minute delay period to reset and start the cycle from the beginning.

2. To Operate System

A. To Operate System for Flight

(1) Set encoder thumbwheel switches to proper trip and date information.

(2) Energize buses.

(3) Place flight recorder on-off switch in on position. Small neon light directly above time remaining indicator should come on and remain on for duration of encoding cycle.

(4) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(5) Place flight recorder on-off switch in off position. Power is automatically applied to system upon actuation of external power relay when airplane leaves runway.

B. To Operate System on Ground

(1) Energize buses.

(2) Set encoder thumbwheel switches to desired trip and date information.

(3) Place flight recorder on-off switch in on position. Small neon light directly above time remaining indicator should come on and remain on for duration of encoding cycle.

(4) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(5) Press event button to indicate occurrence of event on recording medium.

(6) Press repeat button on trip and date encoder if it is desired to repeat trip and date information.

NOTE: System will operate until on-off switch is placed in off position or until power is removed from buses.

FLIGHT RECORDER SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The flight recorder system is an airborne recorder which maintains a permanent, inflight record of altitude, indicated airspeed, heading, and vertical acceleration with respect to time. The records are oscillographic and are made by engraving a line on a metal recording medium. In addition to the four major records, trip and date information is recorded.

B. The flight recorder system consists of a flight recorder unit, an acceleration sensor, a power failure warning light, a pitot source, a static source, and a trip and date encoder.

C. The flight recorder unit with tape motion sensor is installed above the aft cabin ceiling. The unit is calibrated to record altitudes up to 50,000 feet and vertical accelerations from -3g's to +6g's. Heading information is supplied to the recorder from an output synchro in the gyro compass indicator. Pitot pressure is supplied to the recorder from the tail pitot system. Static pressure is supplied from the alternate static system.

D. All data is recorded on a metal recording medium. The medium moves uniformly at a rate of 6 inches per hour and sufficient recording medium is on each spool to record 400 total hours on each side. The medium is fireproof, waterproof, and able to withstand severe shocks and vibration. If unusual conditions are encountered, information from the flight recording medium may be used to facilitate inspection procedures.

E. The acceleration sensor is mounted in the left main wheelwell near the airplane center of gravity. It is a sealed component, which delivers an electrical signal proportional to the forces along its vertical axis. The unit is calibrated to provide signals which are proportional to forces from -3g's to +6g's.

F. A power failure warning light is located on the systems engineer's control panel and indicates a system power failure, a broken foil, or an exhausted recording magazine.

G. A trip and date encoder is installed on the systems engineer's control panel (upper section) and records the trip number and date as a coded series of pulses near the edge of the recording medium. Four thumb switches are used to set in the trip information and two thumb switches are used to set in the date information. An indicator, located on the right side of the face of the encoder, displays the number of hours remaining for the recording medium. A red event button above the indicator is used to mark an encoding pulse on the recording medium to indicate the occurrence of some special event. A black repeat button above the indicator is used to repeat the encoding cycle. An amber

indicating light above the indicator shows that the encoding cycle is in progress. The light goes off when the encoding cycle is completed.

H. The system receives 115-volt, 400-cycle ac power from the flight recorder circuit breaker on the right ac emergency bus. The system receives 28-volt dc power from the flight recorder circuit on the right dc emergency bus. The system is always energized in flight due to the action of a external power relay. A switch is provided on the systems engineer's control panel to bypass the external power relay and supply power to the system on the ground.

I. The tape motion sensor provides a time-delay margin of safety against false indications. The sensor actuates a relay at the end of a 2-minute delay period to reset and start the cycle from the beginning.

2. To Operate System

A. To Operate System for Flight

(1) Set encoder thumbwheel switches to proper trip and date information.

(2) Energize buses.

(3) Place flight recorder on-off switch in on position. Small neon light directly above time remaining indicator should come on and remain on for duration of encoding cycle.

(4) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(5) Place flight recorder on-off switch in off position. Power is automatically applied to system upon actuation of ground control relay when airplane leaves runway.

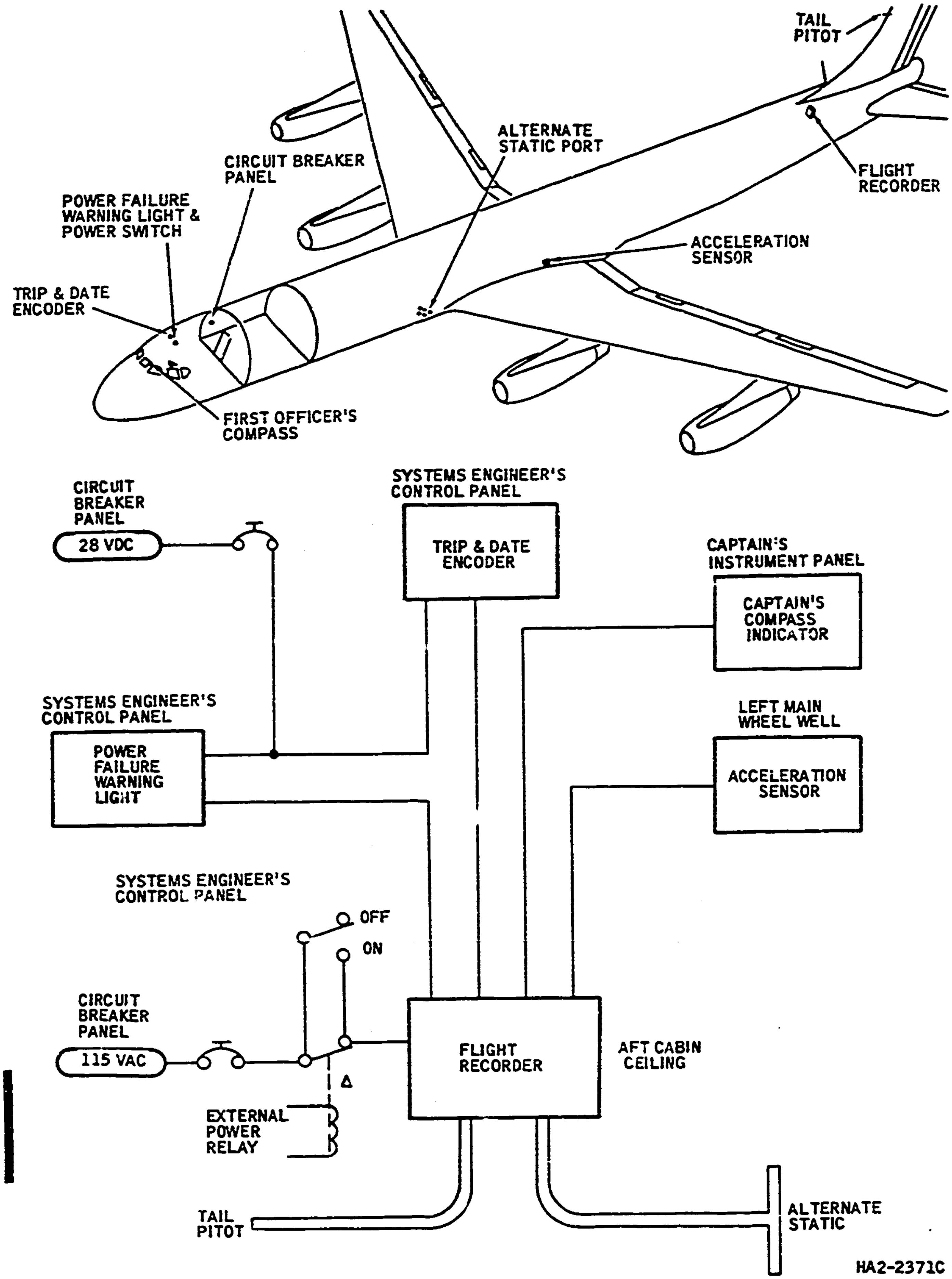
B. To Operate System on Ground

(1) Energize buses.

(2) Set encoder thumbwheel switches to desired trip and date information.

(3) Place flight recorder on-off switch in on position. Small neon light directly above time remaining indicator should come on and remain on for duration of encoding cycle.

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Flight Recorder System -- Block Diagram
Figure 1

(4) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(5) Press event button to indicate occurrence of event on recording medium.

(6) Press repeat button on trip and date encoder if it is desired to repeat trip and date information.

NOTE: System will operate until on-off switch is placed in off position or until power is removed from buses.

FLIGHT RECORDER SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The flight recorder system is an airborne recorder which maintains a permanent, inflight record of altitude, indicated airspeed, heading, and vertical acceleration with respect to time. The records are oscillographic and are made by engraving a line on a metal recording medium. In addition to the four major records, trip and date information is recorded.

B. The flight recorder system consists of a flight recorder unit, an acceleration sensor, a power failure warning light, a pitot source, a static source, and a trip and date encoder.

C. The flight recorder unit with tape motion sensor is installed above the aft cabin ceiling. The unit is calibrated to record altitudes up to 50,000 feet and vertical accelerations from -3g's to +6g's. Heading information is supplied to the recorder from an output synchro in the gyro compass indicator. Pitot pressure is supplied to the recorder from the tail pitot system. Static pressure is supplied from the auxiliary static system.

D. All data is recorded on a metal recording medium. The medium moves uniformly at a rate of 6 inches per hour and sufficient recording medium is on each spool to record 400 total hours on each side. The medium is fireproof, waterproof, and able to withstand severe shocks and vibration. If unusual flight conditions are encountered, information from the flight recording medium may be used to facilitate inspection procedures.

E. The acceleration sensor is mounted in the left main wheelwell near the airplane center of gravity. It is a sealed component which delivers an electrical signal proportional to the forces along its vertical axis. The unit is calibrated to provide signals which are proportional to forces from -3g's to +6g's.

F. A power failure warning light is located on the systems engineer's control panel and indicates a system power failure, a broken foil, or an exhausted recording magazine.

G. A trip and date encoder is installed on the systems engineer's control panel (upper section) and records the trip number and date as a coded series of pulses near the edge of the recording medium. Four thumb switches are used to set in the trip information and two thumb switches are used to set in the date information. An indicator, located on the right side of the face of the encoder, displays the number of hours remaining for the recording medium. A red event button above the indicator is used to mark an encoding pulse on the recording medium to indicate the occurrence of some special event. A black repeat button above the indicator is used to repeat the encoding cycle. An amber indicating light above the indicator shows that the encoding cycle is in progress. The light goes off when the encoding cycle is completed.

H. The system receives 115-volt, 400-cycle ac power from the flight recorder circuit breaker on the right ac emergency bus. The system receives 28-volt dc power from the flight recorder circuit breaker on the right dc emergency bus. The system is always energized in flight due to the action of a ground control relay. A switch is provided on the systems engineer's control panel to bypass the ground control relay and supply power to the system on the ground.

I. The tape motion sensor provides a time-delay margin of safety against false indication. The sensor actuates a relay at the end of a 2-minute delay period to reset and start the cycle from the beginning.

2. To Operate System

A. To Operate System for Flight

(1) Set encoder thumbwheel switches to proper trip and date information.

(2) Energize buses.

(3) Place flight recorder on-off switch in on position. Small neon light directly above time remaining indicator should come on and remain on for duration of encoding cycle.

(4) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(5) Place flight recorder on-off switch in off position. Power is automatically applied to system upon actuation of ground control relay when airplane leaves runway.

B. To Operate System on Ground

(1) Energize buses.

(2) Set encoder thumbwheel switches to desired trip and date information.

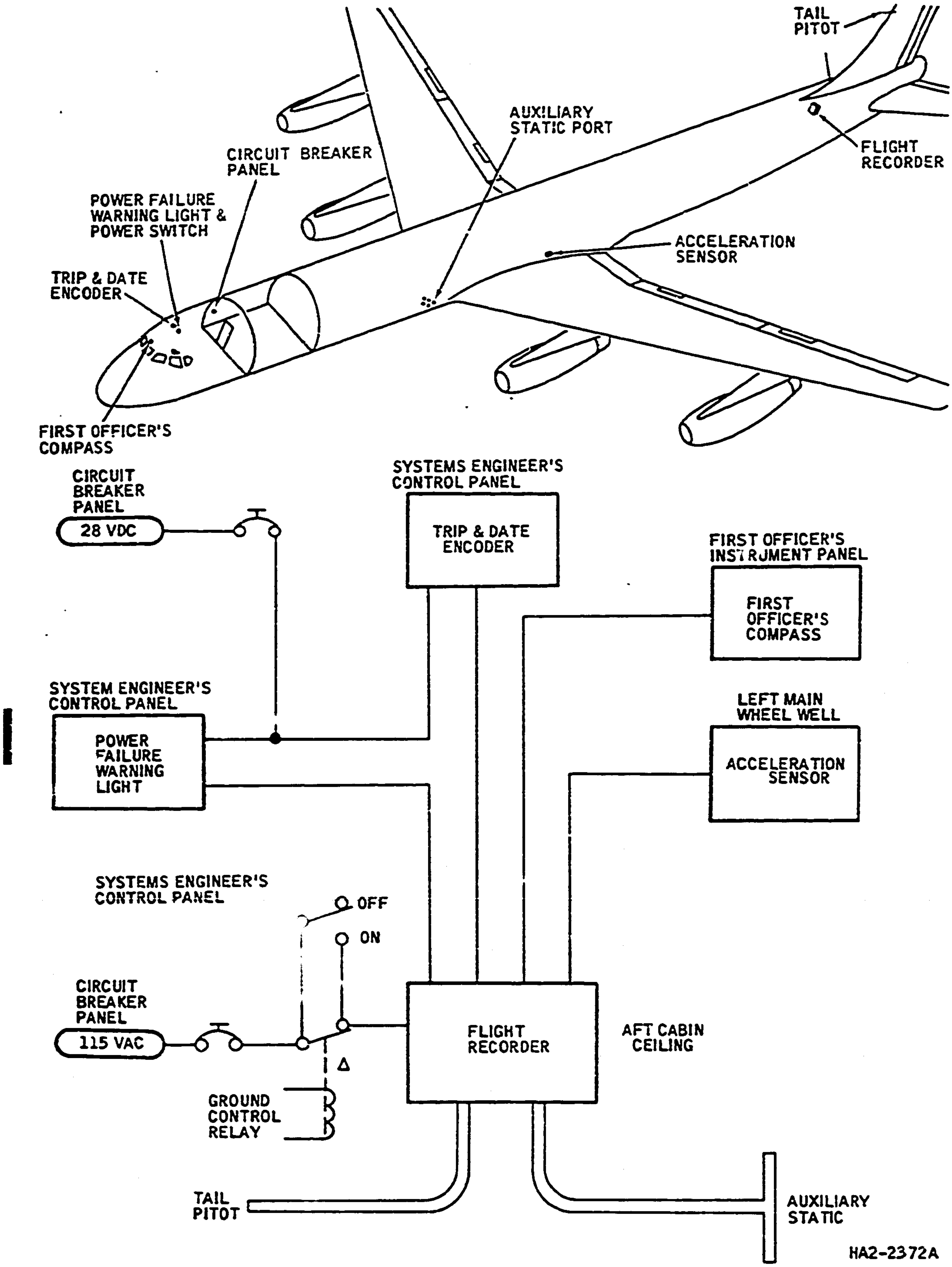
(3) Place flight recorder on-off switch in on position. Small neon light directly above time remaining indicator should come on and remain on for duration of encoding cycle.

(4) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(5) Press event button to indicate occurrence of event on recording medium.

(6) Press repeat button on trip and date encoder if it is desired to repeat trip and date information.

NOTE: System will operate until on-off switch is placed in off position or until power is removed from buses.



Flight Recorder System -- Block Diagram
Figure 1

FLIGHT RECORDER SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The flight recorder system is an airborne recorder which maintains a permanent, inflight record of altitude, indicated airspeed, heading, and vertical acceleration with respect to time. The records are oscillographic and are made by engraving a line on a metal recording medium.

B. The flight recorder system consists of a flight recorder unit, an acceleration sensor, a power failure warning light, a pitot source, and a static source.

C. The flight recorder unit with tape motion sensor is installed above the aft cabin ceiling. The unit is calibrated to record altitudes up to 50,000 feet and vertical accelerations from -3g's to +6g's. Heading information is supplied to the recorder from an output synchro in the gyro compass indicator. Pitot pressure is supplied to the recorder from the tail pitot system. Static pressure is supplied from the alternate static system.

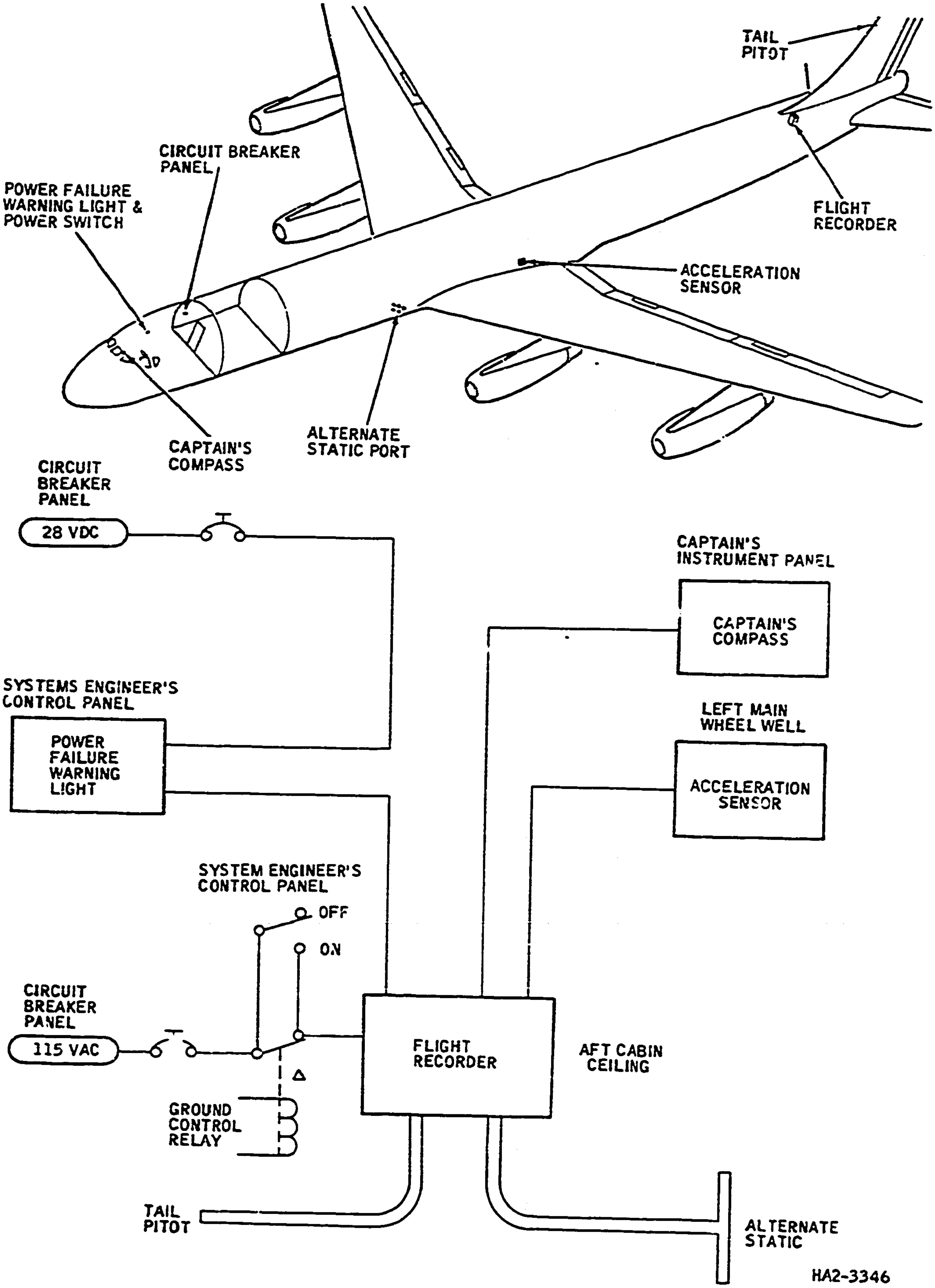
D. All data is recorded on a metal recording medium. The medium moves uniformly at a rate of 6 inches per hour and sufficient recording medium is on each spool to record 400 total hours on each side. The medium is fireproof, waterproof, and able to withstand severe shocks and vibration. If unusual flight conditions are encountered, information from the flight recording medium may be used to facilitate inspection procedures.

E. The acceleration sensor is mounted in the left main wheelwell near the airplane center of gravity. It is a sealed component which delivers an electrical signal proportional to the forces along its vertical axis. The unit is calibrated to provide signals which are proportional to forces from -3g's to +6g's.

F. A power failure warning light is located on the systems engineer's control panel and indicates a system power failure, a broken foil, or an exhausted recording magazine.

G. The system receives 115-volt, 400-cycle ac power from the flight recorder circuit breaker on the right ac emergency bus. The system receives 28-volt dc power from the flight recorder circuit breaker on the right dc emergency bus. The system is always energized in flight due to the action of a ground control relay. A switch is provided on the systems engineer's control panel to bypass the ground control relay and supply power to the system on the ground.

H. The tape motion sensor provides a time-delay relay margin of safety against false indications. The sensor actuates a relay at the end of a 2-minute delay period to reset and start the cycle from the beginning.



Flight Recorder System -- Block Diagram
Figure 1

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2. To Operate System

A. To Operate System

(1) Energize buses.

(2) Place flight recorder on-off switch in on position.

(3) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(4) Place flight recorder on-off switch in off position. Power is automatically applied to system upon actuation of ground control relay when airplane leaves runway.

Printed in U.S.A.

FLIGHT RECORDER SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The flight recorder system is an airborne recorder which maintains a permanent, inflight record of altitude, indicated airspeed, heading, and vertical acceleration with respect to time. The records are oscillographic and are made by engraving a line on a metal recording medium.

B. The flight recorder system consists of a flight recorder unit and servo amplifier, an acceleration sensor, a pitot source, and a static source.

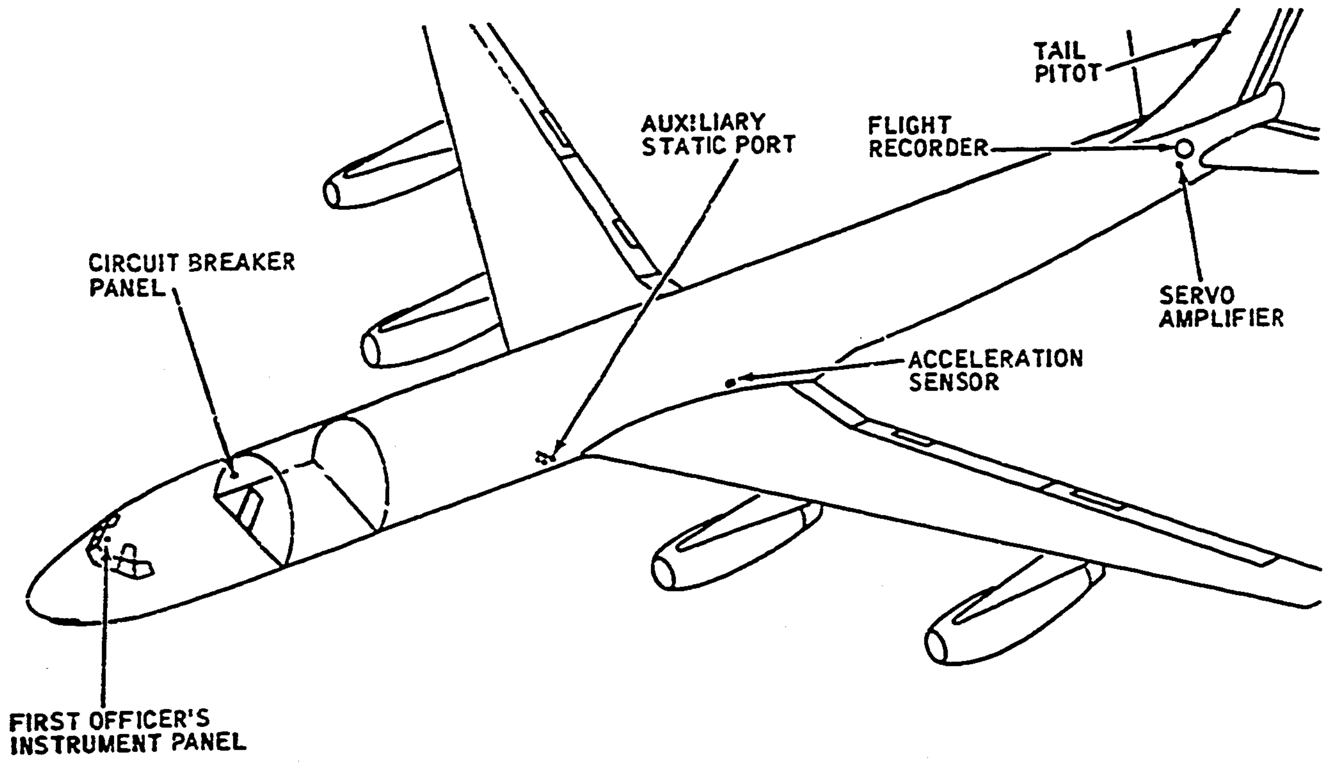
C. The flight recorder unit is installed on a mount in the tail compartment. The unit is calibrated to record altitudes up to 50,000 feet and vertical accelerations from -3g's to +6g's. Heading information is supplied to the recorder from an output synchro in the gyro compass indicator. Pitot pressure is supplied to the recorder from the tail pitot system. Static pressure is supplied from the alternate static system.

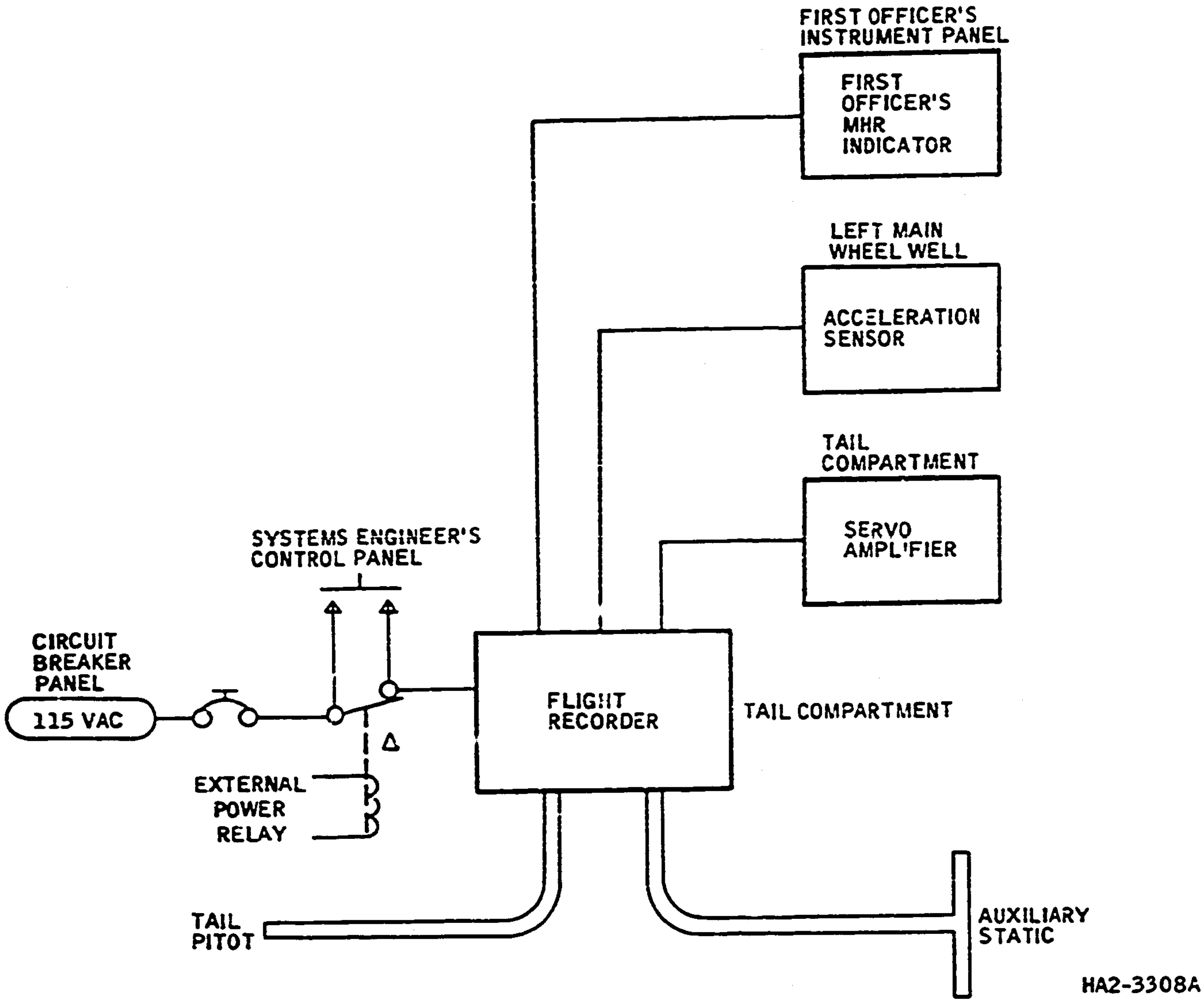
D. All data is recorded on a metal recording medium. The medium moves uniformly at a rate of 6 inches per hour and sufficient recording medium is on each spool to record 200 total hours on each side. The medium is fireproof, waterproof, and able to withstand severe shocks and vibration. If unusual flight conditions are encountered, information from the flight recording medium may be used to facilitate inspection procedures.

E. The acceleration sensor is mounted in the left main wheelwell near the airplane center of gravity. It is a sealed component which delivers an electrical signal proportional to the forces along its vertical axis. The unit is calibrated to provide signals which are proportional to forces from -3g's to +6g's.

F. An interrupted 400-cycle beep signal is audible in the systems engineer's headset when the recorder monitor switch is placed in the flight recorder position. The beep frequency varies with the amount of recording medium remaining on the spool. A frequency of 6 beeps per minute indicates a full spool. A frequency of 20 beeps per minute indicates a nearly empty spool.

G. The system receives 115-volt, 400-cycle ac power from the flight recorder circuit breaker on the right ac emergency bus. The system is always energized in flight due to the action of an external power relay. A momentary on switch is provided on the systems engineer's control panel to bypass the external power relay. The switch can be used to verify proper system operation while the airplane is on the ground.





Flight Recorder System -- Block Diagram
Figure 1

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FLIGHT RECORDER SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The flight recorder system is an airborne recorder which maintains a permanent, inflight record of altitude, indicated airspeed, heading, and vertical acceleration with respect to time. The records are oscillographic and are made by engraving a line on a metal recording medium. In addition to the four major records, trip and date information is recorded.

B. The flight recorder system consists of a flight recorder unit, an accleration sensor, a power failure warning light, a pitot source, a static source, and a trip and date encoder.

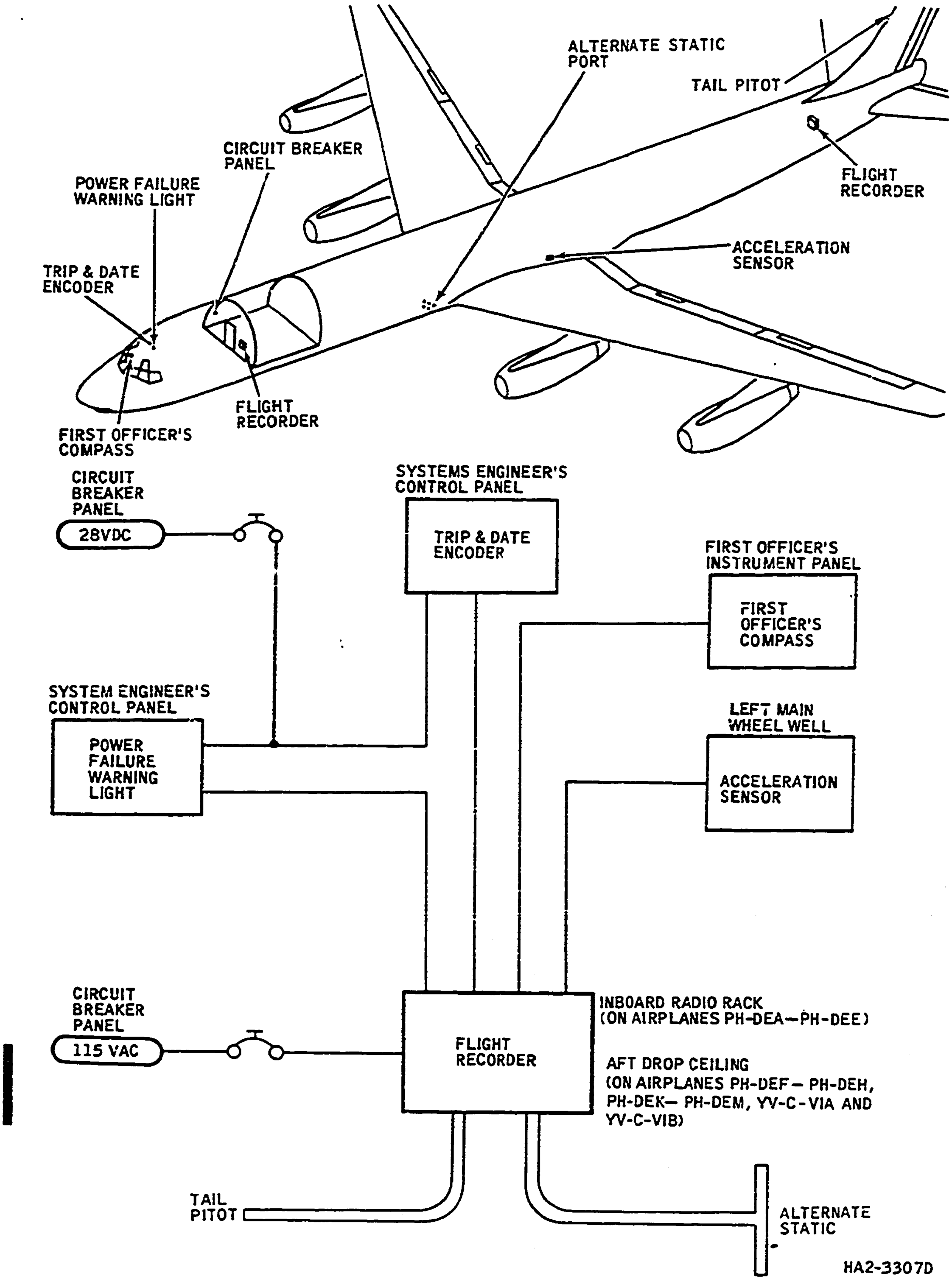
C. The flight recorder unit with tape motion sensor is installed on the inboard radio rack on airplanes PH-DEA through PH-DEE and on the aft overhead ceiling on airplanes PH-DEF through PH-DEH, PH-DEK through PH-DEM, YV-C-VIA, and YV-C-VIB. The unit is calibrated to record altitudes up to 50,000 feet and vertical accelerations from -3g's to +6g's. Heading information is supplied to the recorder from an output synchro in the gyro compass indicator. Pitot pressure is supplied to the recorder from the tail pitot system. Static pressure is supplied from the alternate static system.

D. All data is recorded on a metal recording medium. The medium moves uniformly at a rate of 6 inches per hour and sufficient recording medium is on each spool to record 400 total hours on each side. The midium is fireproof, waterproof, and able to withstand severe shocks and vibration. If unusual flight conditions are encountered, information from the flight recording medium may be used to facilitate inspection procedures.

E. The acceleration sensor is mounted in the left main wheelwell near the airplane center of gravity. It is a sealed component which delivers an electrical signal proportional to the forces along its vertical axis. The unit is calibrated to provide signals which are proportional to forces from -3g's to +6g's.

F. A power failure warning light is located on the systems engineer's control panel and indicates a system power failure, a broken foil, or an exhausted recording magazine.

G. A trip and date encoder is installed on the systems engineer's control panel (upper frame) and records the trip number and date as a coded series of pulses near the edge of the recording medium. Four thumb switches are used to set in the trip information and two thumb switches are used to set in the date information. An indicator, located on the right side of the face of the encoder, displays the number of hours remaining for the recording medium. An amber event button above the indicator is used



Flight Recorder System -- Block Diagram
Figure 1

to mark an encoding pulse on the recording medium to indicate the occurrence of some special event. A black repeat button above the indicator is used to repeat the encoding cycle. An amber indicating light above the indicator shows that the encoding cycle is in progress. The light goes off when the encoding cycle is completed.

H. The system receives 115-volt, 400-cycle ac power from the flight recorder circuit breaker on the right ac emergency bus. The system receives 28-volt dc power from the flight recorder circuit breaker on the right dc emergency bus. The system is always energized when power is applied to the airplane.

I. The tape motion sensor provides a time-delay relay margin of safety against false indications. The sensor actuates a relay at the end of a 2-minute delay period to reset and start the cycle from the beginning.

2. To Operate System

A. To Operate System for Flight

(1) Set encoder thumbwheel switches to proper trip and date information.

(2) Energize buses. Small neon light directly above time remaining indicator should come on and remain on for duration of encoding cycle.

(3) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

B. To Operate System on Ground

(1) Set encoder thumbwheel switches to desired trip and date information.

(2) Energize buses. Small neon light directly above time remaining indicator should come on and remain on for duration of encoding cycle.

(3) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(4) Press event button to indicate occurrence of event on recording medium.

(5) Press repeat button on trip and date encoder if it is desired to repeat trip and date information.

FLIGHT RECORDER SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The flight recorder system is an airborne recorder which maintains a permanent, inflight record of altitude, indicated airspeed, heading, and vertical acceleration with respect to time. The records are oscillographic and are made by engraving a line on a metal recording medium. In addition to the four major records, trip and date information is recorded.

B. The flight recorder system consists of a flight recorder unit, an acceleration sensor, a power failure warning light, a pitot source, a static source, and a trip and date encoder.

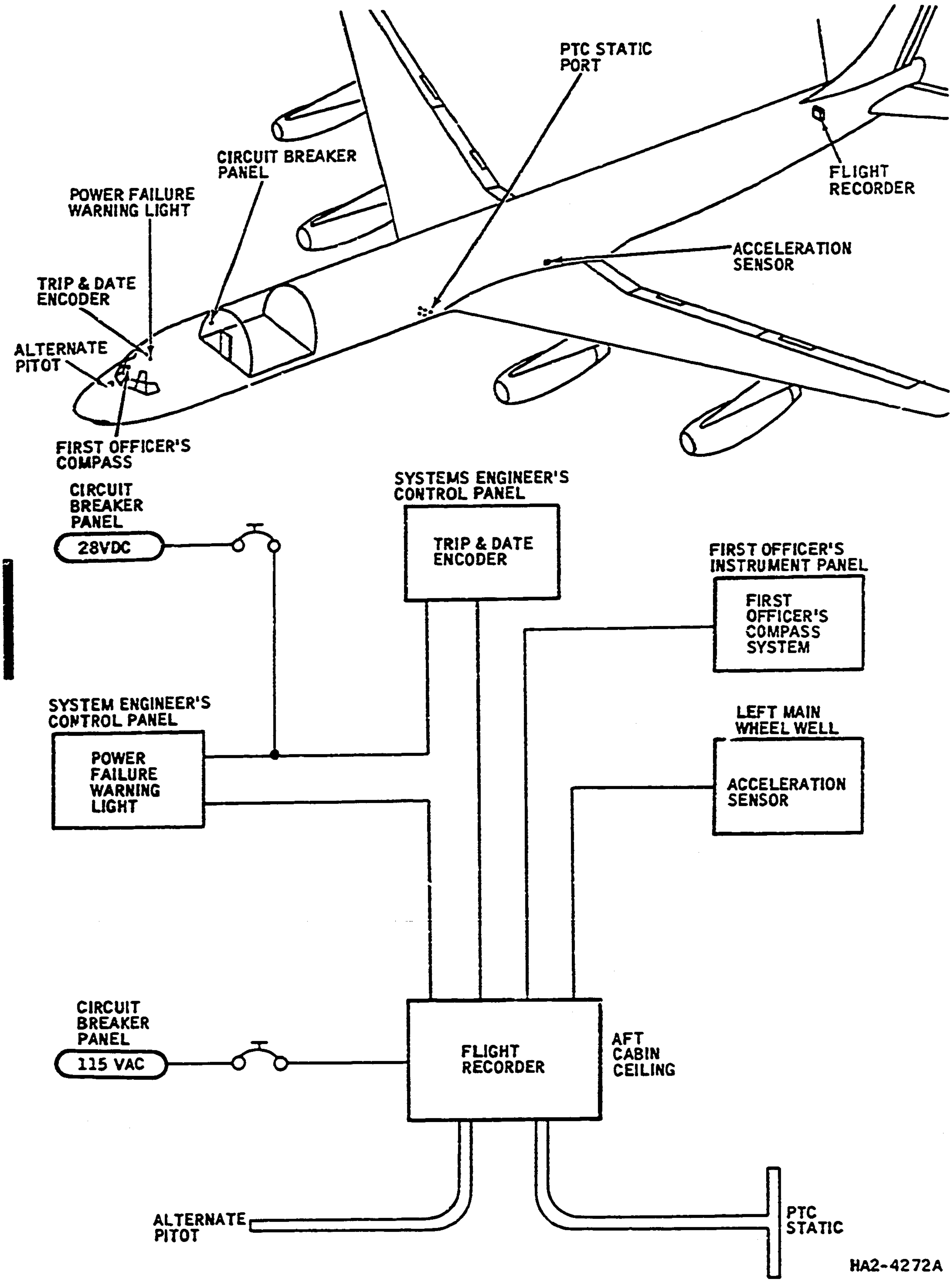
C. The flight recorder unit with tape motion sensor is installed above the aft cabin ceiling. The unit is calibrated to record altitudes up to 50,000 feet and vertical accelerations from -3g's to +6g's. Heading information is supplied to the recorder from an output synchro in the compass system. Pitot pressure is supplied to the recorder from the alternate pitot system. Static pressure is supplied from the PTC static system.

D. All data is recorded on a metal recording medium. The medium moves uniformly at a rate of 6 inches per hour and sufficient recording medium is on each spool to record 400 total hours on each side. The medium is fireproof, waterproof, and able to withstand severe shocks and vibration. If unusual flight conditions are encountered, information [illegible] the flight recording medium may be used to facilitate inspection procedures.

E. The acceleration sensor is mounted in the left main wheelwell near the airplane center of gravity. It is a sealed component which delivers an electrical signal proportional to the forces along its vertical axis. The unit is calibrated to provide signals which are proportional to forces from -3g's to +6g's.

F. A power failure warning light is located on the systems engineer's control panel and indicates a system power failure, a broken foil, or an exhausted recording magazine.

G. A trip and date encoder is installed on the systems engineer's control panel (upper section) and records the trip number and date as a coded series of pulses near the edge of the recording medium. Four thumb switches are used to set in the trip information and two thumb switches are used to set in the date information. An indicator, located on the right side of the face of the encoder, displays the number of hours remaining for the recording medium. A red event button above the indicator is used to mark an encoding pulse on the recording medium to indicate the occurrence of some special event. A black repeat button above the indicator is used to repeat the encoding cycle. An amber indicating light above the indicator shows that the encoding cycle is in progress. The light goes off when the encoding cycle is completed.



Flight Recorder System -- Block Diagram
Figure 1

H. The system receives 115-volt, 400-cycle ac power from the flight recorder circuit breaker on the right ac emergency bus and radio bus 3. The system receives 28-volt dc power from the flight recorder circuit breaker on the right dc emergency bus.

I. The tape motion sensor provides a time-delay relay margin of safety against false indications. The sensor actuates a relay at the end of a 2-minute delay period to reset and start the cycle from the beginning.

2. To Operate System

A. To Operate System for Flight

(1) Set encoder thumbwheel switches to proper trip and date information.

(2) Energize buses. Small neon light directly above time remaining indicator should come on and remain on for duration of encoding cycle.

(3) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(4) Power is automatically applied to system when airplane leaves runway.

B. To Operate System on Ground

(1) Set encoder thumbwheel switches to desired trip and date information.

(2) Energize buses. Small neon light directly above time remaining indicator should come on and remain on for duration of encoding cycle.

(3) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(4) Press event button to indicate occurrence of event on recording medium.

(5) Press repeat button on trip and date encoder if it is desired to repeat trip and date information.

NOTE: System will operate until power is removed from buses.

FLIGHT RECORDER SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The flight recorder system is an airborne recorder which maintains a permanent, inflight record of altitude, indicated airspeed, heading, and vertical acceleration with respect to time. The records are oscillographic and are made by engraving a line on a metal recording medium. In addition to the four major records, trip and date information is recorded.

B. The flight recorder system consists of a flight recorder unit, an acceleration sensor, a power failure warning light, a pitot source, a static source, and a trip and date encoder.

C. The flight recorder unit with tape motion sensor is installed above the aft cabin ceiling. The unit is calibrated to record altitudes up to 50,000 feet and vertical accelerations from -3g's to +6g's. Heading information is supplied to the recorder from an output synchro in the gyro compass indicator. Pitot pressure is supplied to the recorder from the tail pitot system. Static pressure is supplied from the auxiliary static system.

D. All data is recorded on a metal recording medium. The medium moves uniformly at a rate of 6 inches per hour and sufficient recording medium is on each spool to record 400 total hours on each side. The medium is fireproof, waterproof, and able to withstand severe shocks and vibration. If unusual flight conditions are encountered, information from the flight recording medium may be used to facilitate inspection procedures.

E. The acceleration sensor is mounted in the left main wheelwell near the airplane center of gravity. It is a sealed component which delivers an electrical signal proportional to the forces along its vertical axis. The unit is calibrated to provide signals which are porportional to forces from -3g's to +6g's.

F. A power failure warning light is located on the systems engineer's control panel and indicates a system power failure, a broken foil, or an exhausted recording magazine.

G. A trip and date encoder is installed on the systems engineer's control panel (upper section) and records the trip number and date as a coded series of pulses near the edge of the recording medium. Four thumb switches are used to set in the trip information and two thumb switches are used to set in the date information. An indicator, located on the right side of the face of the encoder, displays the number of hours remaining for the recording medium. A red event button above the indicator is used to mark an encoding pulse on the recording medium to indicate the occurrence of some special event. A black repeat button above the indicator is used to repeat the encoding cycle. An amber indicating light above the indicator shows that the encoding cycle is in progress. The light goes off when the encoding cycle is completed.

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H. The system receives 115-volt, 400-cycle ac power from the flight recorder circuit breaker on the right ac emergency bus. The system receives 28-volt dc power from the flight recorder circuit breaker on the right dc emergency bus. The system is always energized in flight due to the action of a ground control relay. A switch is provided on the systems engineer's control panel to bypass the ground control relay and supply power to the system on the ground.

I. The tape motion sensor provides a time-delay relay margin of safety against false indications. The sensor actuates a relay at the end of a 2-minute delay period to reset and start the cycle from the beginning.

2. To Operate System

A. To Operate System for Flight

(1) Set encoder thumbwheel switches to proper trip and date information.

(2) Energize buses.

(3) Place flight recorder on-off switch in on position. Small neon light directly above time remaining indicator should come on and remain on for duration of encoding cycle.

(4) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(5) Place flight recorder on-off switch in off position. Power is automatically applied to system upon actuation of ground control relay when airplane leaves runway.

B. To Operate System on Ground

(1) Energize buses.

(2) Set encoder thumbwheel switches to desired trip and date information.

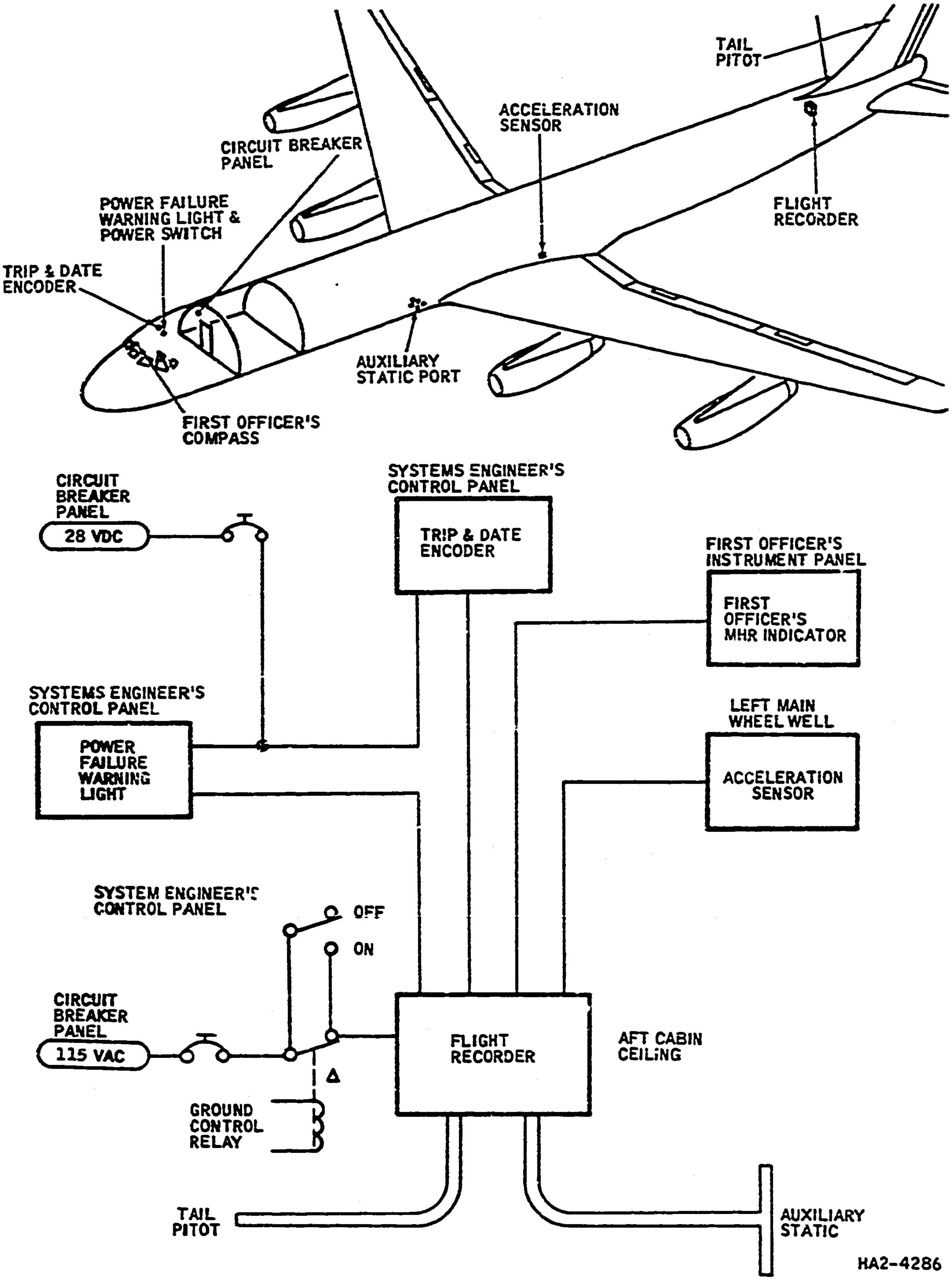
(3) Place flight recorder on-off switch in on position. Small neon light directly above time remaining indicator should come on and remain on for duration of encoding cycle.

(4) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(5) Press event button to indicate occurrence of event on recording medium.

(6) Press repeat button on trip and date encoder if it is desired to repeat trip and date information.

NOTE: System will operate until on-off switch is placed in off position or until power is removed from buses.



Flight Recorder System -- Block Diagram
Figure 1

FLIGHT RECORDER SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The flight recorder system is an airborne recorder which maintains a permanent, inflight record of altitude, indicated airspeed, heading, and vertical acceleration with respect to time. The records are oscillographic and are made by engraving a line on a metal recording medium.

B. The flight recorder system consists of a flight recorder unit, an acceleration sensor, a power failure warning light, a pitot source, a static source, and a trip and date encoder.

C. The flight recorder unit with tape motion sensor is installed above the aft cabin ceiling. The unit is calibrated to record altitudes up to 50,000 feet and vertical accelerations from -3g's to +6g's. Heading information is supplied to the recorder from an output synchro in the gyro-compass indicator. Pitot pressure is supplied to the recorder from the tail pitot system. Static pressure is supplied from the alternate static system.

D. All data is recorded on a metal recording medium. The medium moves uniformly at a rate of 6 inches per hour and sufficient recording medium is on each spool to record 300 total hours on each side. The medium is fireproof, waterproof, and able to withstand severe shocks and vibration. If unusual flight conditions are encountered, information from the flight recording medium may be used to facilitate inspection procedures.

E. The acceleration sensor is mounted in the left main wheelwell near the airplane center of gravity. It is a sealed component which delivers an electrical signal proportional to the forces along its vertical axis. The unit is calibrated to provide signals which are proportional to forces from -3g's to +6g's.

F. A power failure warning light is located on the systems engineer's control panel and indicates a system power failure, a broken foil, or an exhausted recording magazine.

G. A trip data encoder is installed on the system engineer's control panel (upper section) and records the trip number and date as a coded series of pulses near the edge of the recording medium. Four thumb switches are used to set in the trip information and two thumb switches are used to set in the date information. An indicator, located on the right side of the face of the encoder, displays the number of hours remaining for the recording medium. A red event button underneath the indicator is used to mark an encoding pulse on the recording medium to indicate the occurence of some special event. A black repeat button underneath the indicator is used to repeat the encoding cycle. An amber indicating light between the repeat and event buttons shows that the encoding cycle is in progress. The light goes off when the encoding cycle is completed.

Printed in U.S.A.

H. The system receives 115-volt, 400-cycle ac power from the flight recorder circuit breaker on the right ac emergency bus. The system receives 28-volt dc power from the flight recorder circuit breaker on the right dc emergency bus. The system is always energized in flight due to the action of a ground control relay. A switch is provided on the systems engineer's control panel to bypass the ground control relay and supply power to the system on the ground.

I. The tape motion sensor provides a time-delay relay margin of safety against false indications. The sensor actuates a relay at the end of a 2-minute delay period to reset and start the cycle from the beginning.

2. <u>To Operate System</u>

A. To Operate System for Flight

(1) Energize buses.

(2) Place flight recorder on-off switch in on position.

(3) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(4) Set encoder thumbwheel switches to proper trip and date information.

(5) Press repeat button on trip and date encoder. Small neon light directly below time remaining indicator should come on and remain on for duration of encoding cycle.

(6) Upon completion of encoding cycle, on-off switch can be placed in off position to conserve recording medium. Power is automatically applied to system upon actuation of ground control relay when airplane leaves runway.

B. To Operate System on Ground

(1) Energize buses.

(2) Place flight recorder on-off switch in on position.

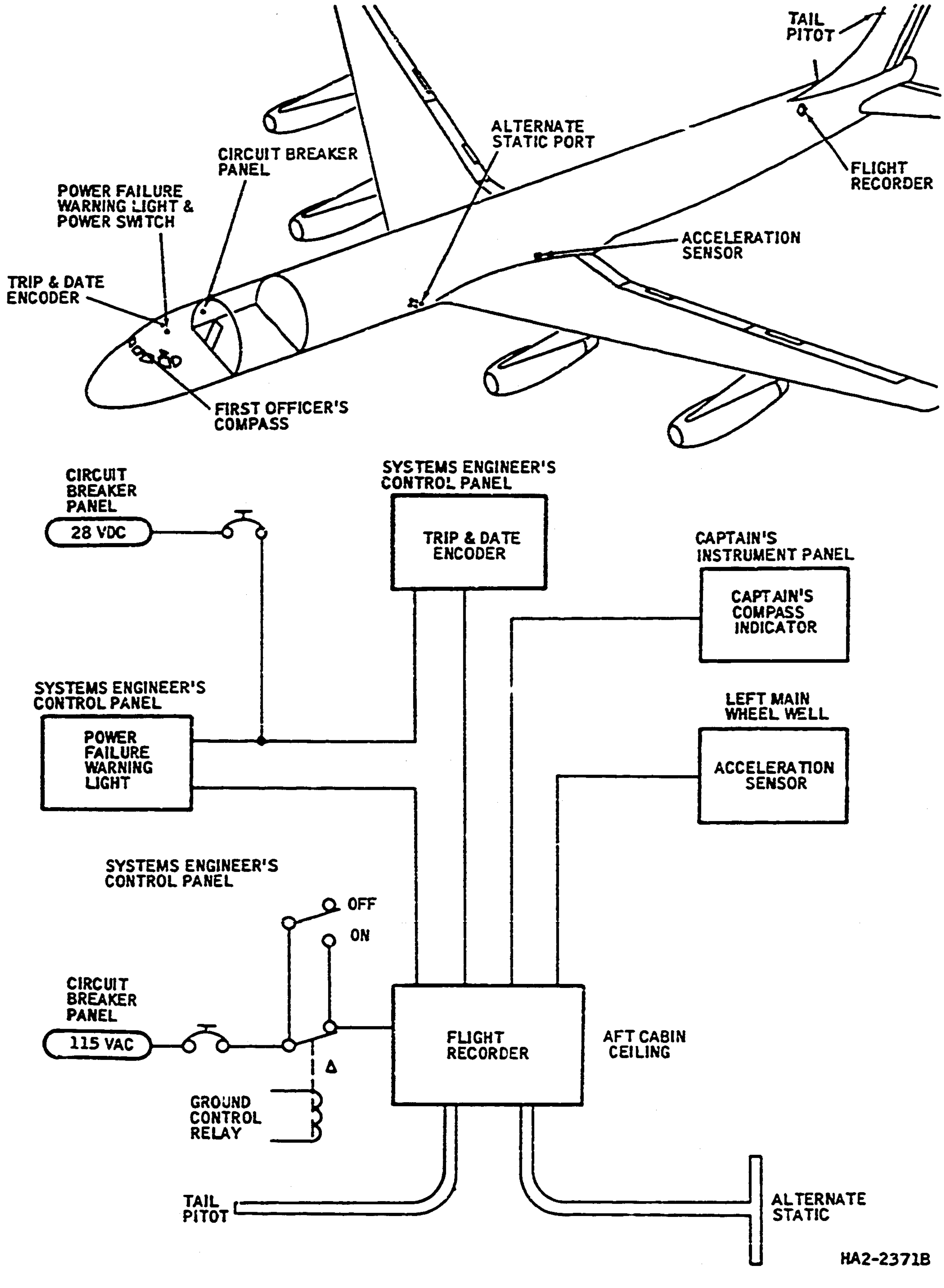
(3) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(4) Set encoder thumbwheel switches to desired trip and date information.

(5) Press repeat button on trip and date encoder. Small neon light directly below time remaining indicator should come on and remain on for duration of encoding cycle.

(6) Press event button to indicate occurrence of event on recording medium.

NOTE: System will operate until on-off switch is placed in off position or until power is removed from buses.



Flight Recorder System -- Block Diagram
Figure 1

FLIGHT RECORDER SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The flight recorder system is an airborne recorder which maintains a permanent, inflight record of altitude, indicated airspeed, heading, and vertical acceleration with respect to time. The records are oscillographic and are made by engraving a line on a metal recording medium.

B. The flight recorder system consists of a flight recorder unit, an acceleration sensor, a power failure warning light, a pitot source, and a static source.

C. The flight recorder unit with tape motion sensor is installed above the aft cabin ceiling. The unit is calibrated to record altitudes up to 50,000 feet and vertical accelerations from -3g's to +6g's. Heading information is supplied to the recorder from an output synchro in the gyro compass indicator. Pitot pressure is supplied to the recorder from the tail pitot system. Static pressure is supplied from the alternate static system.

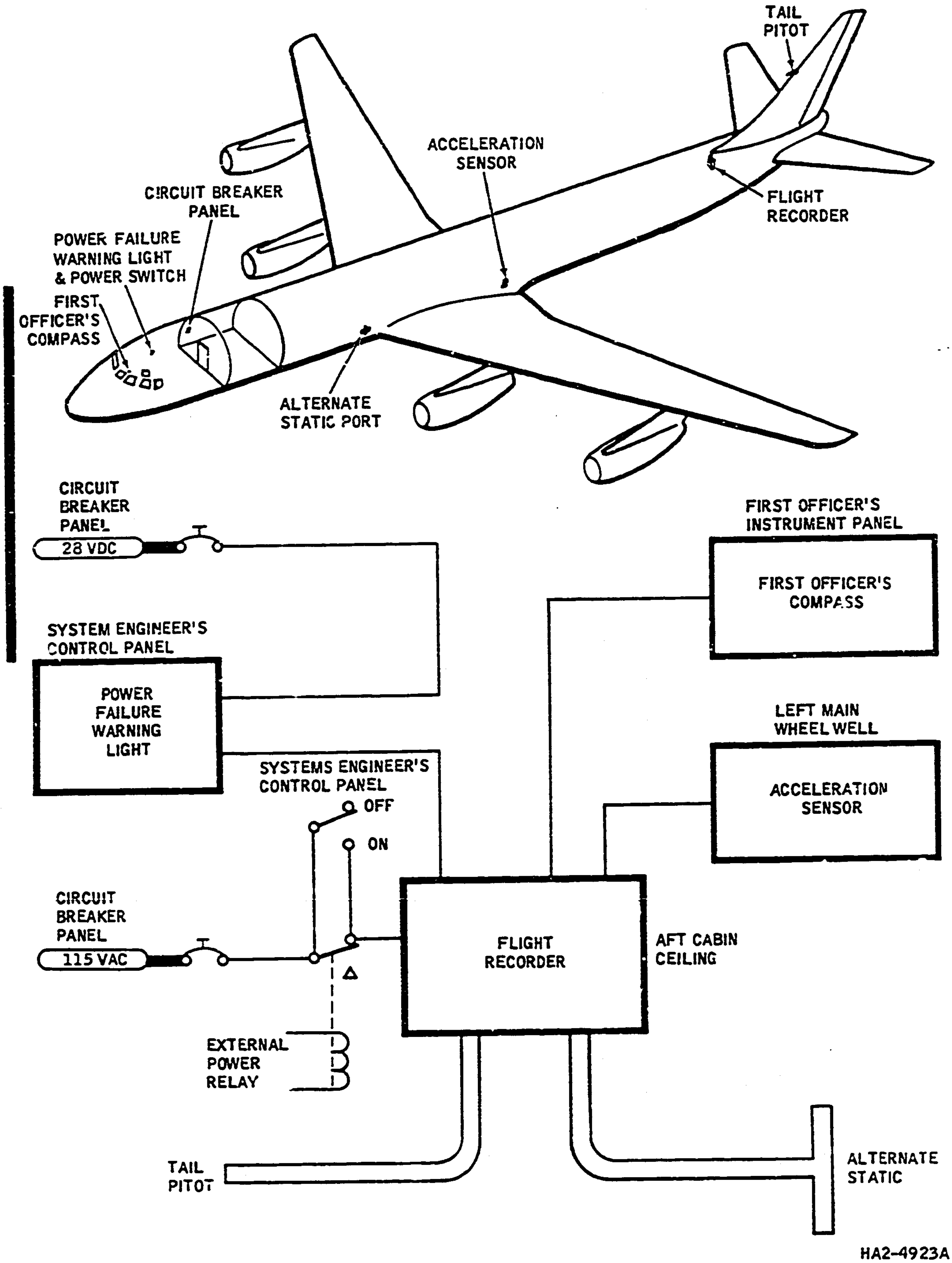
D. All data is recorded on a metal recording medium. The medium moves uniformly at a rate of 6 inches per hour and sufficient recording medium is on each spool to record 400 total hours on each side. The medium is fireproof, waterproof, and able to withstand severe shocks and vibration. If unusual flight conditions are encountered, information from the flight recording medium may be used to facilitate inspection procedures.

E. The acceleration sensor is mounted in the left main wheelwell near the airplane center of gravity. It is a sealed component which delivers an electrical signal proportional to the forces along its vertical axis. The unit is calibrated to provide signals which are proportional to forces from -3g's to +6g's.

F. A power failure warning light is located on the systems engineer's control panel and indicates a system power failure, a broken foil, or an exhausted recording magazine.

G. The system receives 115-volt, 400-cycle ac power from the flight recorder circuit breaker on the right ac emergency bus. The system receives 28-volt dc power from the flight recorder circuit breaker on the right dc emergency bus. The system is always energized in flight due to the action of a external power relay. A switch is provided on the systems engineer's control panel to bypass the ground control relay and supply power to the system on the ground.

H. The tape motion sensor provides a time-delay relay margin of safety against false indications. The sensor actuates a relay at the end of a 2-minute delay period to reset and start the cycle from the beginning.



Flight Recorder System -- Block Diagram
Figure 1

2. To Operate System

A. To Operate System

(1) Energize buses.

(2) Place flight recorder on-off switch in on position.

(3) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(4) Place flight recorder on-off switch in off position. Power is automatically applied to system upon actuation of external power relay when airplane leaves runway.

FLIGHT RECORDER SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The flight recorder system is an airborne recorder which maintains a permanent, inflight record of altitude, indicated airspeed, heading, and vertical acceleration with respect to time. The records are oscillographic and are made by engraving a line on a metal recording medium.

B. The flight recorder system consists of a flight recorder unit, an acceleration sensor, a power failure warning light, a pitot source, and a static source.

C. The flight recorder unit with tape motion sensor is installed above the aft cabin ceiling. The unit is calibrated to record altitudes up to 50,000 feet and vertical accelerations from -3g's to +6g's. Heading information is supplied to the recorder from an output synchro in the gyro compass indicator. Pitot pressure is supplied to the recorder from the tail pitot system. Static pressure is supplied from the alternate static system.

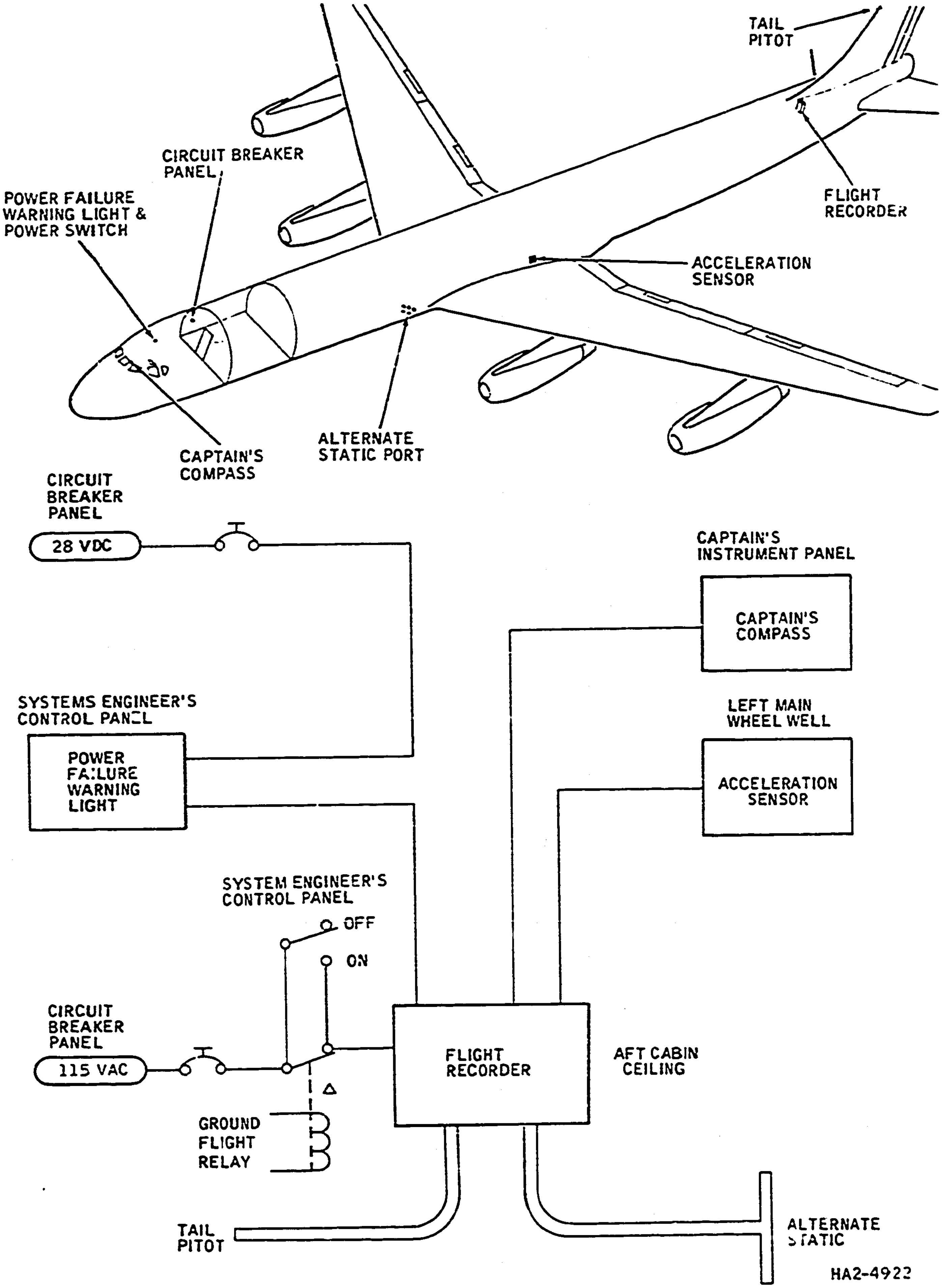
D. All data is recorded on a metal recording medium. The medium moves uniformly at a rate of 6 inches per hour and sufficient recording medium is on each spool to record 400 total hours on each side. The medium is fireproof, waterproof, and able to withstand severe shocks and vibration. If unusual flight conditions are encountered, information from the flight recording medium may be used to facilitate inspection procedures.

E. The acceleration sensor is mounted in the left main wheelwell near the airplane center of gravity. It is a sealed component which delivers an electrical signal proportional to the forces along its vertical axis. The unit is calibrated to provide signals which are proportional to forces from -3g's to +6g's.

F. A power failure warning light is located on the systems engineer's control panel and indicates a system power failure, a broken foil, or an exhausted recording magazine.

G. The system receives 115-volt, 400-cycle ac power from the flight recorder circuit breaker on the right ac emergency bus. The system receives 28-volt dc power from the flight recorder circuit breaker on the right dc emergency bus. The system is always energized in flight due to the action of a flight/ground relay. A switch is provided on the systems engineer's control panel to bypass the ground control relay and supply power to the system on the ground.

H. The tape motion sensor provides a time-delay relay margin of safety against false indications. The sensor actuates a relay at end of a 2-minute delay period to reset and start the cycle from the beginning.



Flight Recorder System -- Block Diagram
Figure 1

2. To Operate System

A. To Operate System

(1) Energize buses.

(2) Place flight recorder on-off switch in on position.

(3) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(4) Place flight recorder on-off switch in off position. Power is automatically applied to system upon actuation of flight/ground relay when airplane leaves runway.

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FLIGHT RECORDER SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The flight recorder system is an airborne recorder which maintains a permanent, inflight record of altitude, indicated airspeed, heading, and vertical acceleration with respect to time. The records are oscillographic and are made by engraving a line on a metal recording medium. In addition to the four major records, trip and date information is recorded.

B. The flight recorder system consists of a flight recorder unit, an acceleration sensor, a power failure warning light, a pitot source, a static source, and a trip and date encoder.

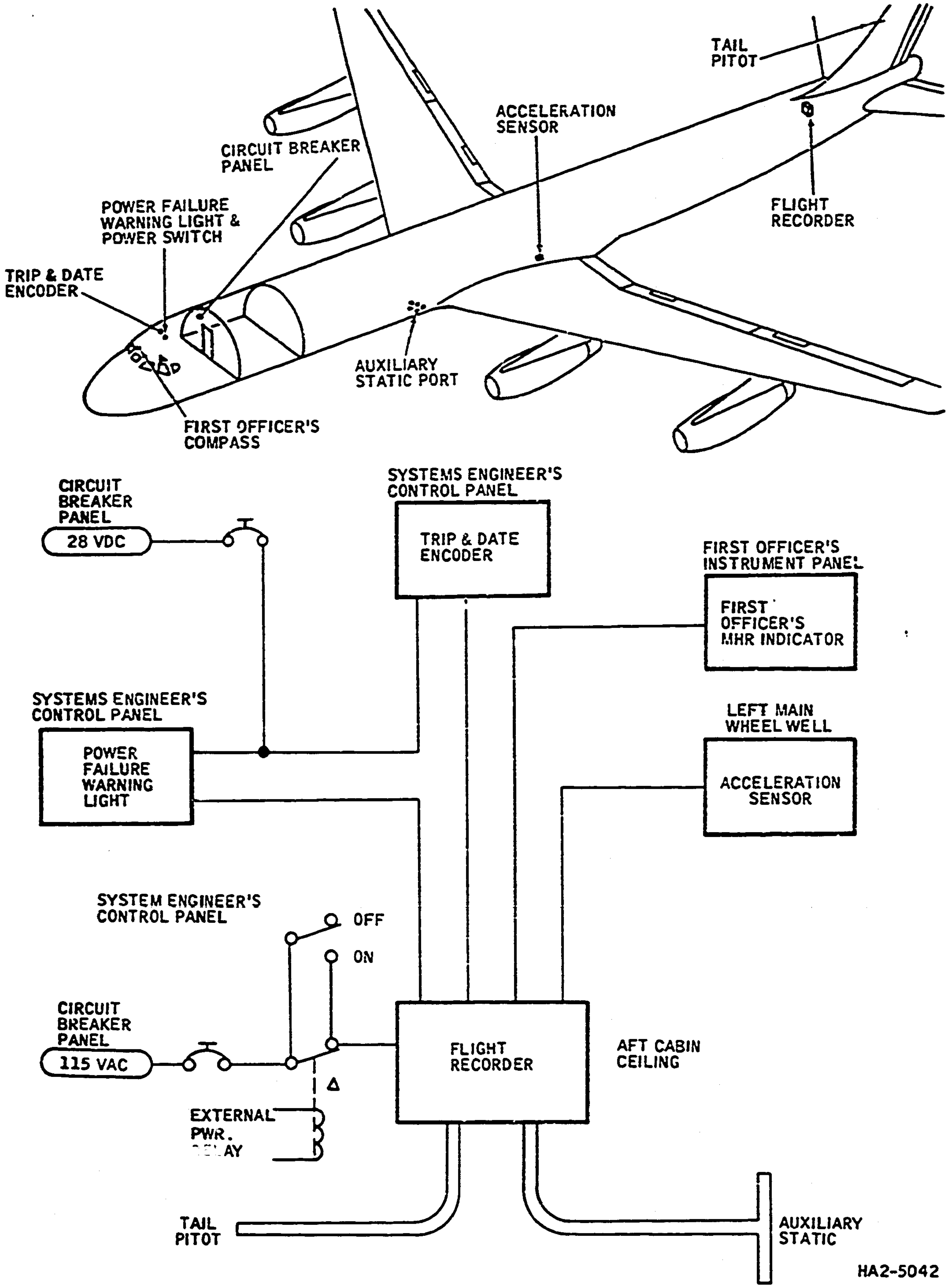
C. The flight recorder unit with tape motion sensor is installed above the aft cabin ceiling. The unit is calibrated to record altitudes up to 50,000 feet and vertical accelerations from -3g's to +6g's. Heading information is supplied to the recorder from an output synchro in the first officer's master heading radio indicator. Pitot pressure is supplied to the recorder from the tail pitot system. Static pressure is supplied from the auxiliary static system.

D. All data is recorded on a metal recording medium. The medium moves uniformly at a rate of 6 inches per hour and sufficient recording medium is on each spool to record 400 total hours on each side. The medium is fireproof, waterproof, and able to withstand severe shocks and vibration. If unusual flight conditions are encountered, information from the flight recording medium may be used to facilitate inspection procedures.

E. The acceleration sensor is mounted in the left main wheelwell near the airplane center of gravity. It is a sealed component which delivers an electrical signal proportional to the forces along its vertical axis. The unit is calibrated to provide signals which are porportional to forces from -3g's to +6g's.

F. A power failure warning light is located on the systems engineer's control panel and indicates a system power failure, a broken foil, or an exhausted recording magazine.

G. A trip and date encoder is installed on the systems engineer's control panel (upper section) and records the trip number and date as a coded series of pulses near the edge of the recording medium. Four thumb switches are used to set in the trip information and two thumb switches are used to set in the date information. An indicator, located on the right side of the face of the encoder, displays the number of hours remaining for the recording medium. A red event button above the indicator is used to mark an encoding pulse on the recording medium to indicate the occurrence of some special event. A black repeat button above the indicator is used to repeat the encoding cycle. An amber indicating light above the indicator shows that the encoding cycle is in progress. The light goes off when the encoding cycle is completed.



Flight Recorder System -- Block Diagram
Figure 1

Printed in U.S.A.

H. The system receives 115-volt, 400-cycle ac power from the flight recorder circuit breaker on the right ac emergency bus. The system receives 28-volt dc power from the flight recorder circuit breaker on the right dc emergency bus. The system is always energized in flight due to the action of a ground control relay. A switch is provided on the systems engineer's control panel to bypass the external power relay and supply power to the system on the ground.

I. The tape motion sensor provides a time-delay relay margin of safety against false indications. The sensor actuates a relay at the end of a 2-minute delay period to reset and start the cycle from the beginning.

2. <u>To Operate System</u>

A. To Operate System for Flight

(1) Set encoder thumbwheel switches to proper trip and date information.

(2) Energize buses.

(3) Place flight recorder on-off switch in on position. Small neon light directly above time remaining indicator should come on and remain on for duration of encoding cycle.

(4) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(5) Place flight recorder on-off switch in off position. Power is automatically applied to system upon actuation of external power relay when airplane leaves runway.

B. To Operate System on Ground

(1) Energize buses.

(2) Set encoder thumbwheel switches to desired trip and date information.

(3) Place flight recorder on-off switch in on position. Small neon light directly above time remaining indicator should come on and remain on for duration of encoding cycle.

(4) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(5) Press event button to indicate occurrence of event on recording medium.

(6) Press repeat button on trip and date encoder if it is desired to repeat trip and date information.

<u>NOTE</u>: System will operate until on-off switch is placed in off position or until power is removed from buses.

FLIGHT RECORDER SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The flight recorder system is an airborne recorder which maintains a permanent, inflight record of altitude, indicated airspeed, heading, and vertical acceleration with respect to time. The records are oscillographic and are made by engraving a line on a metal recording medium.

B. The flight recorder system consists of a flight recorder unit, and acceleration sensor, a power failure warning light, a pitot source, a static source, and a trip and date encoder.

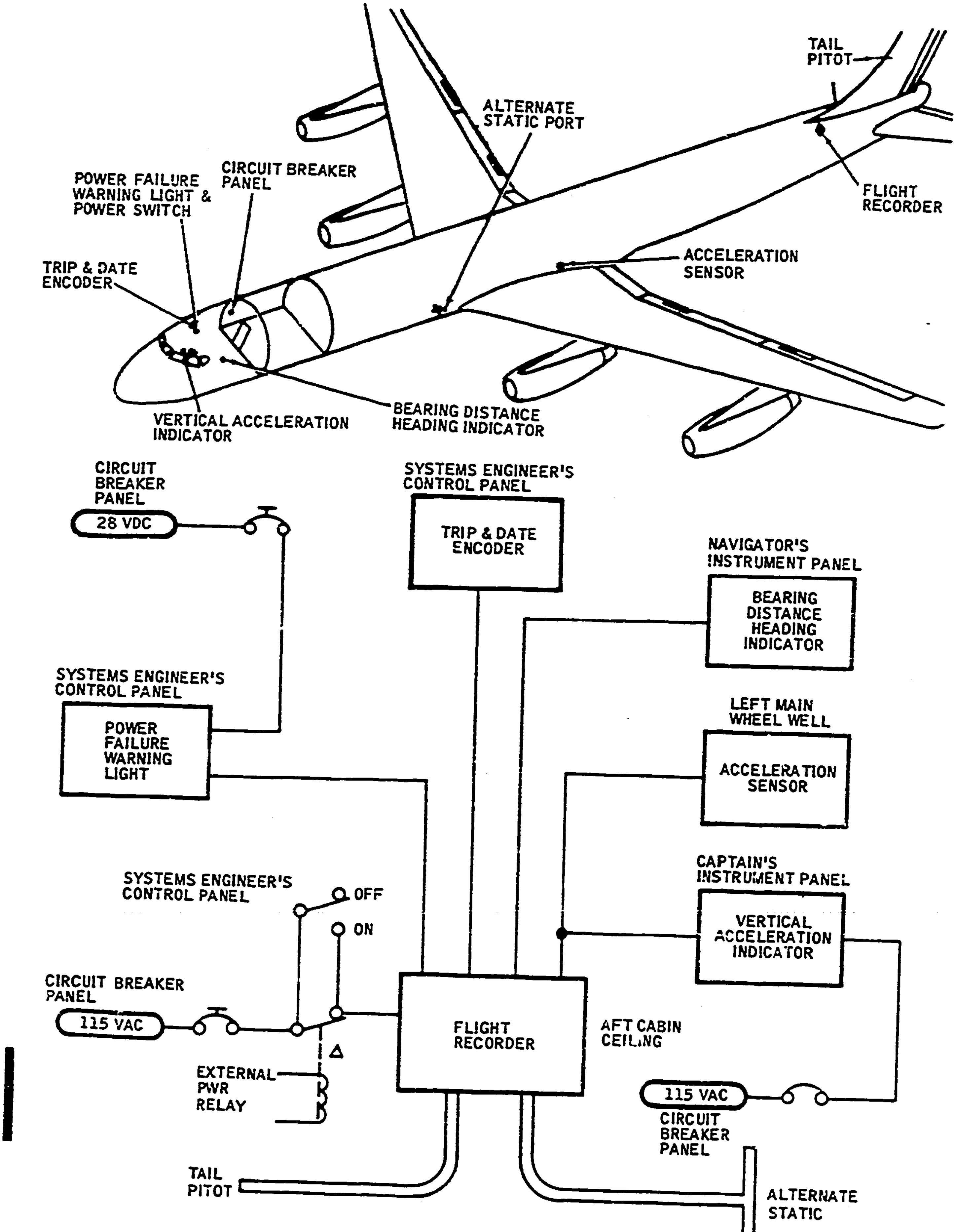
C. The flight recorder unit with tape motion sensor is installed above the aft cabin ceiling. The unit is calibrated to record altitudes up to 50,000 feet and vertical accelerations from -3g's to +6g's. Heading information is supplied to the recorder from an output synchro in the gyro-compass indicator. Pitot pressure is supplied to the recorder from the tail pitot system. Static pressure is supplied from the alternate static system.

D. All data is recorded on a metal recording medium. The medium moves uniformly at a rate of 6 inches per hour and sufficient recording medium is on each spool to record 300 total hours on each side. The medium is fireproof, waterproof, and able to withstand severe shocks and vibration. If unusual flight conditions are encountered, information from the flight recording medium may be used to facilitate inspection procedures.

E. The acceleration sensor is mounted in the left main wheelwell near the airplane center of gravity. It is a sealed component which delivers an electrical signal proportional to the forces along its vertical axis. The unit is calibrated to provide signals which are proportional to forces from -3g's to +6g's.

F. A power failure warning light is located on the systems engineer's control panel and indicates a system power failure, a broken foil, or an exhausted recording magazine.

G. A trip data encoder is installed on the system engineer's control panel (upper section) and records the trip number and date as a coded series of pulses near the edge of the recording medium. Four thumb switches are used to set in the trip information and two thumb switches are used to set in the date information. An indicator, located on the right side of the face of the encoder, displays the number of hours remaining for the recording medium. A red event button underneath the indicator is used to mark an encoding pulse on the recording medium to indicate the occurrence of some special event. A black repeat button underneath the indicator is used to repeat the encoding cycle. An amber indicating light between the repeat and event buttons shows that the encoding cycle is in progress. The light goes off when the encoding cycle is completed.



Flight Recorder System -- Block Diagram
Figure 1

H. The system receives 115-volt, 400-cycle ac power from the flight recorder circuit breaker on the right ac emergency bus. The system receives 28-volt dc power from the flight recorder circuit breaker on the right dc emergency bus. The system is always energized in flight due to the action of a ground control relay. A switch is provided on the systems engineer's control panel to bypass the ground control relay and supply power to the system on the ground.

I. The tape motion sensor provides a time-delay relay margin of safety against false indications. The sensor actuates a relay at the end of a 2-minute delay period to reset and start the cycle from the beginning.

2. To Operate System

A. To Operate System for Flight

(1) Energize buses.

(2) Place flight recorder on-off switch in on position.

(3) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(4) Set encoder thumbwheel switches to proper trip and date information.

(5) Press repeat button on trip and date encoder. Small neon light directly below time remaining indicator should come on and remain on for duration of encoding cycle.

(6) Upon completion of encoding cycle, on-off switch can be placed in off position to conserve recording medium. Power is automatically applied to system upon actuation of ground control relay when airplane leaves runway.

B. To Operate System on Ground

(1) Energize buses.

(2) Place flight recorder on-off switch in on position.

(3) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(4) Set encoder thumbwheel switches to desired trip and date information.

(5) Press repeat button on trip and date encoder. Small neon light directly below time remaining indicator should come on and remain on for duration of encoding cycle.

(6) Press event button to indicate occurrence of event on recording medium.

NOTE: System will operate until on-off switch is placed in off position or until power is removed from buses.

FLIGHT RECORDER SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The flight recorder system is an aileron recorder which maintains a permanent, inflight record of altitude, indicated airspeed, heading, and vertical acceleration with respect to time. The records are oscillographic and are made by engraving a line on a metal recording medium. In addition to the four major records, trip and date information is recorded and inputs from the VHF-1 and VHF-2 communications systems indicate when a microphone push-to-talk switch has been pushed.

B. The flight recorder system consists of a flight recorder unit, an acceleration sensor, a power failure warning light, an air data failure monitor, a central air data computer, inputs from the VHF-1 and VHF-2 communications systems, and a trip and date encoder.

C. The flight recorder unit with tape motion sensor is installed on the left stowage rack on airplanes N8095U through N8099U and on the aft overhead pressure bulkhead on airplanes N8966U through N8975U. The unit is calibrated to record altitudes up to 50,000 feet and vertical accelerations from -3g's to +6g's. Heading information is supplied to the recorder from the master heading radio indicator. Electrical impulses are supplied to the recorder from the air data computer No. 1 located in the radio rack. The computer provides altitude and airspeed signals and a fail signal to the flight recorder. A fail signal from the computer is indicated the same as a recorder failure. The inputs from the VHF-1 and VHF-2 communications systems are taken directly from the microphone push-to-talk switches.

D. All data is recorded on a metal recording medium. The medium moves uniformly at a rate of 6 inches per hour and sufficient recording medium is on each spool to record 300 total hours on each side. The medium is fireproof, waterproof, and able to withstand severe shocks and vibration. If unusual flight conditions are encountered, information from the flight recording medium may be used to facilitate inspection procedures.

E. The acceleration sensor is mounted in the left main wheelwell near the airplane center of gravity. It is a sealed component which delivers an electrical signal proportional to the forces along its vertical axis. The unit is calibrated to provide signals which are proportional to forces from -3g's to +6g's.

F. A power failure warning light is located on the systems engineer's control panel and indicates a system power failure, a broken foil, an exhausted recording magazine, or a computer failure.

G. A trip date encoder is installed on the system engineer's control panel (upper frame) and records the trip number and date as a coded series of pulses near the edge of the recording medium. Four thumb switches are used to set in the trip information and two thumb switches are used to set in the date information. An indicator, located on the right side of

the face of the encoder, displays the number of hours remaining for the recording medium. A red event button underneath the indicator is used to mark an encoding pulse on the recording medium to indicate the occurrence of some special event. A black repeat button underneath the indicator is used to repeat the encoding cycle. An amber indicating light between the repeat and event buttons shows that the encoding cycle is in progress. The light goes off when the encoding cycle is completed.

H. The system receives 115-volt, 400-cycle ac power from the flight recorder circuit breaker on the left ac emergency bus. The system receives 28-volt dc power from the flight recorder circuit breaker on the left dc emergency bus. The system is always energized in flight due to the action of a ground control relay. A switch is provided on the systems engineer's control panel to bypass the ground control relay and supply power to the system on the ground.

I. The tape motion sensor provides a time delay margin of safety against false indications. The sensor actuates a relay at the end of a 2-minute delay period to reset and start the cycle from the beginning.

2. To Operate System

A. To Operate System for Flight

(1) Energize buses.

(2) Place flight recorder on-off switch in on position.

(3) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(4) Set encoder thumbwheel switches to proper trip and date information.

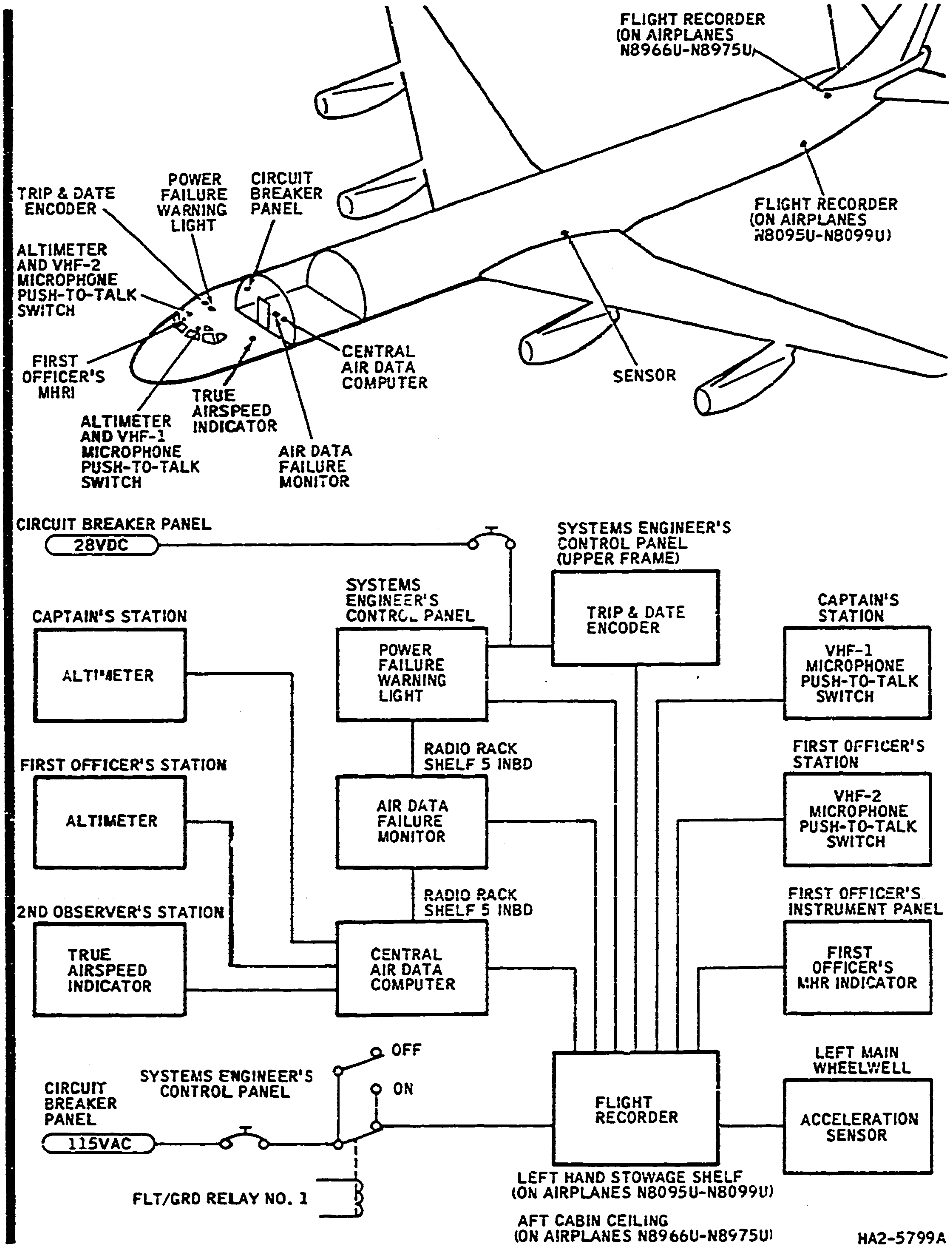
(5) Press repeat button on trip and date encoder. Small neon light directly below time remaining indicator should come on and remain on for duration of encoding cycle.

(6) Upon completion of encoding cycle, on-off switch can be placed in off position to conserve recording medium. Power is automatically applied to system upon actuation of ground control relay when airplane leaves runway.

B. To Operate System on Ground

(1) Energize buses.

(2) Place flight recorder on-off switch in on position.



Flight Recorder System -- Block Diagram
Figure 1

(3) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(4) Set encoder thumbwheel switches to desired trip and date information.

(5) Press repeat button trip and date encoder. Small neon light directly below time remaining indicator should come on and remain on for duration of encoding cycle.

(6) Press event button to indicate occurrence of event on recording medium.

<u>NOTE</u>: System will operate until on-off switch is placed in off position or until power is removed from buses.

FLIGHT RECORDER SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The flight recorder system is an airborne recorder which maintains a permanent, inflight record of altitude, indicated airspeed, heading, and vertical acceleration with respect to time. The records are oscillographic and are made by engraving a line on a metal recording medium. In addition to the four major records, trip and date information is recorded.

B. The flight recorder system consists of a flight recorder unit, an acceleration sensor, a power failure warning light, a pitot source, a static source, and a trip and date encoder.

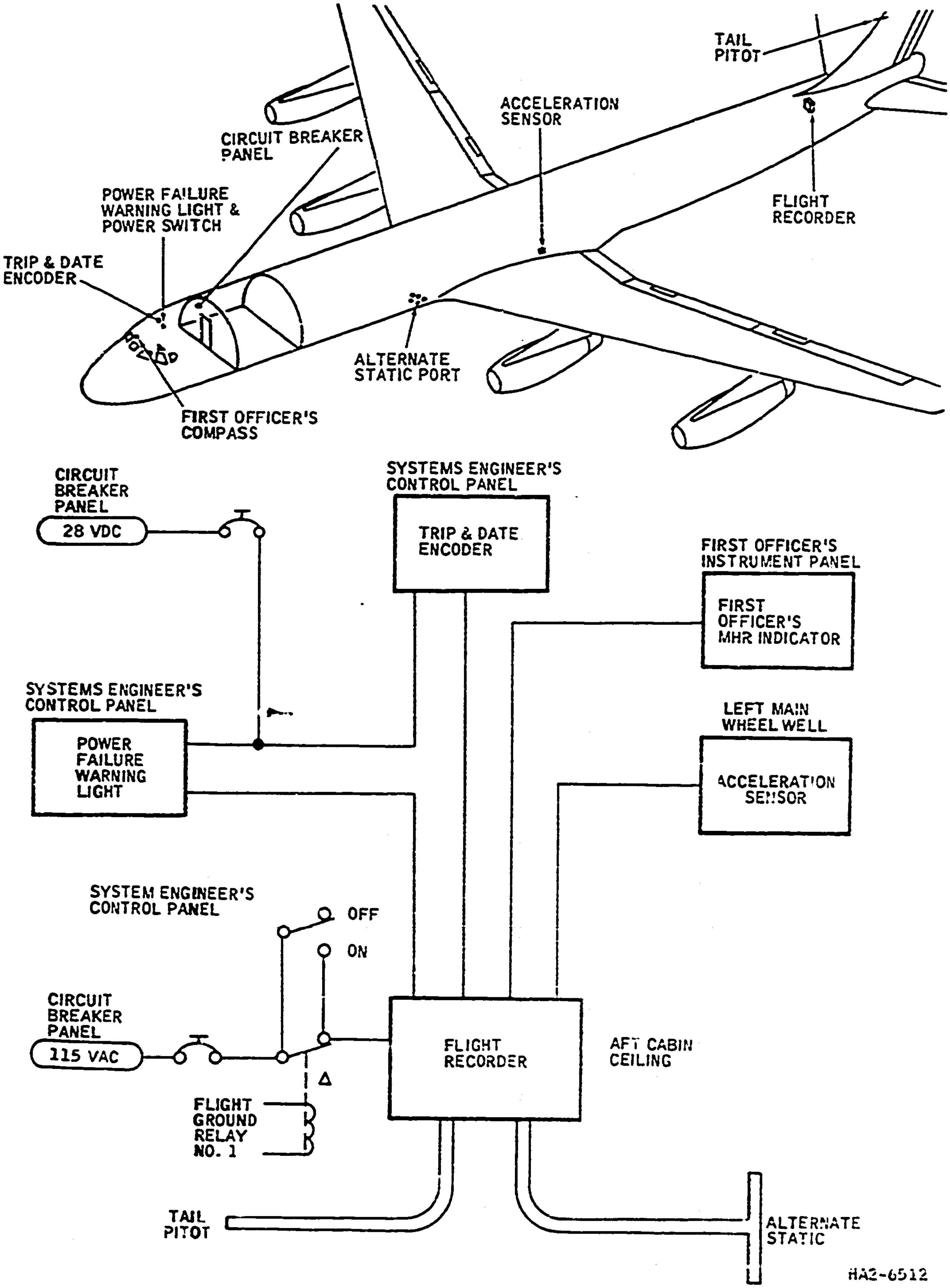
C. The flight recorder unit with tape motion sensor is installed above the aft cabin ceiling. The unit is calibrated to record altitudes up to 50,000 feet and vertical accelerations from -3g's to +6g's. Heading information is supplied to the recorder from an output synchro in the first officer's master heading radio indicator. Pitot pressure is supplied to the recorder from the tail pitot system. Static pressure is supplied from the alternate static system.

D. All data is recorded on a metal recording medium. The medium moves uniformly at a rate of 6 inches per hour and sufficient recording medium is on each spool to record 400 total hours on each side. The medium is fireproof, waterproof, and able to withstand severe shocks and vibration. If unusual flight conditions are encountered, information from the flight recording medium may be used to facilitate inspection procedures.

E. The acceleration sensor is mounted in the left main wheelwell near the airplane center of gravity. It is a sealed component which delivers an electrical signal proportional to the forces along its vertical axis. The unit is calibrated to provide signals which are porportional to forces from -3g's to +6g's.

F. A power failure warning light is located on the systems engineer's control panel and indicates a system power failure, a broken foil, or an exhausted recording magazine.

G. A trip and date encoder is installed on the systems engineer's control panel (upper section) and records the trip number and date as a coded series of pulses near the edge of the recording medium. Four thumb switches are used to set in the trip information and two thumb switches are used to set in the date information. An indicator, located on the right side of the face of the encoder, displays the number of hours remaining for the recording medium. A red event button above the indicator is used to mark an encoding pulse on the recording medium to indicate the occurrence of some special event. A black repeat button above the indicator is used to repeat the encoding cycle. An amber indicating light above the indicator shows that the encoding cycle is in progress. The light goes off when the encoding cycle is completed.



Flight Recorder System -- Block Diagram
Figure 1

H. The system receives 115-volt, 400-cycle ac power from the flight recorder circuit breaker on the right ac emergency bus. The system receives 28-volt dc power from the flight recorder circuit breaker on the right dc emergency bus. The system is always energized in flight due to the action of a flight ground relay. A switch is provided on the systems engineer's control panel to bypass the flight ground relay No. 1 and supply power to the system on the ground.

I. The tape motion sensor provides a time-delay relay margin of safety against false indications. The sensor actuates a relay at the end of a 2-minute delay period to reset and start the cycle from the beginning.

2. To Operate System

A. To Operate System for Flight

(1) Set encoder thumbwheel switches to proper trip and date information.

(2) Energize buses.

(3) Place flight recorder on-off switch in on position. Small neon light directly above time remaining indicator should come on and remain on for duration of encoding cycle.

(4) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(5) Place flight recorder on-off switch in off position. Power is automatically applied to system upon actuation of the flight ground relay No. 1 when airplane leaves runway.

B. To Operate System on Ground

(1) Energize buses.

(2) Set encoder thumbwheel switches to desired trip and date information.

(3) Place flight recorder on-off switch in on position. Small neon light directly above time remaining indicator should come on and remain on for duration of encoding cycle.

(4) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(5) Press event button to indicate occurrence of event on recording medium.

(6) Press repeat button on trip and date encoder if it is desired to repeat trip and date information.

NOTE: System will operate until on-off switch is placed in off position or until power is removed from buses.

FLIGHT RECORDER SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The flight recorder system is an airborne recorder which maintains a permanent, inflight record of altitude, indicated airspeed, heading, and vertical acceleration with respect to time. The records are oscillographic and are made by engraving a line on a metal recording medium.

B. The flight recorder system consists of a flight recorder unit, an acceleration sensor, a power failure warning light, a pitot source, and a static source.

C. The flight recorder unit with tape motion sensor is installed above the aft cabin ceiling. The unit is calibrated to record altitudes up to 50,000 feet and vertical accelerations from -3g's to +6g's. Heading information is supplied to the recorder from an output synchro in the gyro compass indicator. Pitot pressure is supplied to the recorder from the tail pitot system. Static pressure is supplied from the alternate static system.

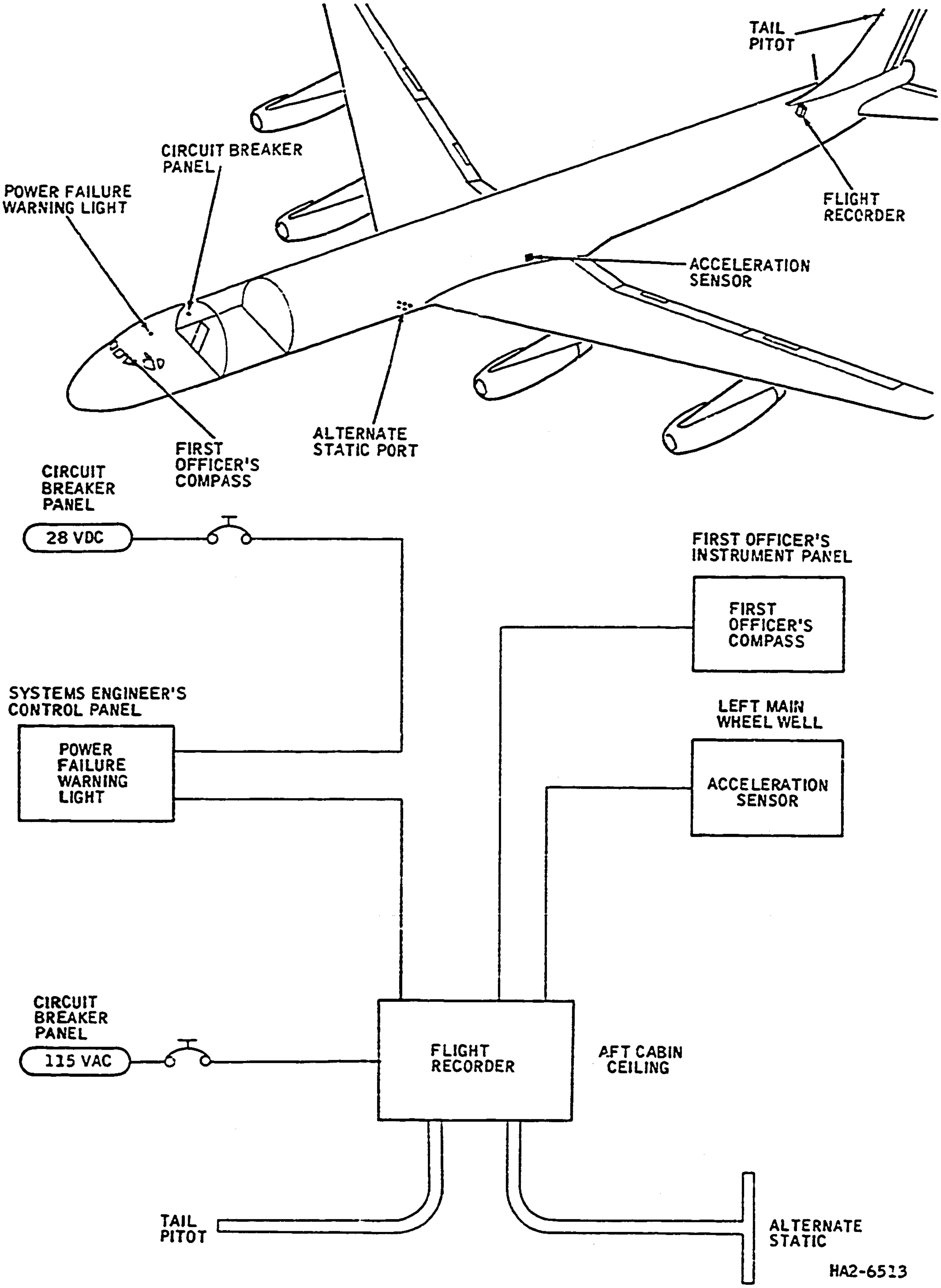
D. All data is recorded on a metal recording medium. The medium moves uniformly at a rate of 6 inches per hour and sufficient recording medium is on each spool to record 400 total hours on each side. The medium is fireproof, waterproof, and able to withstand severe shocks and vibration. If unusual flight conditions are encountered, information from the flight recording medium may be used to facilitate inspection procedures.

E. The acceleration sensor is mounted in the left main wheelwell near the airplane center of gravity. It is a sealed component which delivers an electrical signal proportional to the forces along its vertical axis. The unit is calibrated to provide signals which are proportional to forces from -3g's to +6g's.

F. A power failure warning light is located on the systems engineer's control panel and indicates a system power failure, a broken foil, or an exhausted recording magazine.

G. The system receives 115-volt, 400-cycle ac power from the flight recorder circuit breaker on the right ac emergency bus. The system receives 28-volt dc power from the flight recorder circuit breaker on the right dc emergency bus.

H. The tape motion sensor provides a time-delay relay margin of safety against false indications. The sensor actuates a relay at the end of a 2-minute delay period to reset and start the cycle from the beginning.



Flight Recorder System -- Block Diagram
Figure 1

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2. To Operate System

A. To Operate System

(1) Energize buses.

(2) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(3) Power is automatically applied to system when airplane leaves runway.

FLIGHT RECORDER SYSTEM - DESCRIPTION AND OPERATION

1. General

A. The flight recorder system is an airborne recorder which maintains a permanent, inflight record of altitude, indicated airspeed, heading, and vertical acceleration with respect to time. The records are oscillographic and are made by engraving a line on a metal recording medium. In addition to the four major records, trip and date information is recorded.

B. The flight recorder system consists of a flight recorder unit, an acceleration sensor, a po. r failure warning light, a pitot source, a static source, and a trip and date encoder.

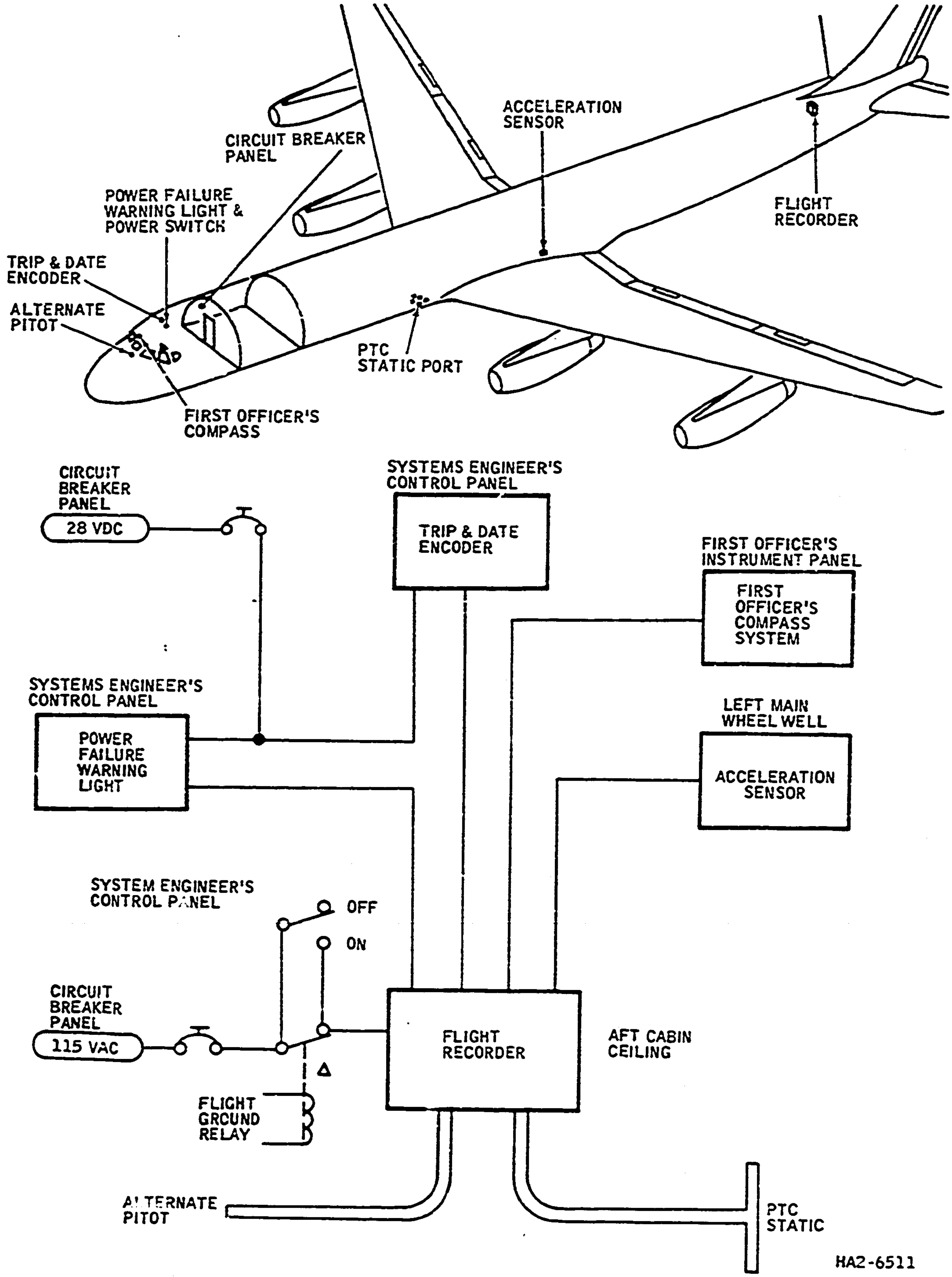
C. The flight recorder unit with tape motion sensor is installed above the aft cabin ceiling. The unit is calibrated to record altitudes up to 50,000 feet and vertical accelerations form -3g's to +6g's. Heading information is supplied to the recorder from an output synchro in the compass system. Pitot pressure is supplied to the recorder from the alternate pitot system. Static pressure is supplied from the PTC static system.

D. All data is recorded on a metal recording medium. The medium moves uniformly at a rate of 6 inches per hour and sufficient recording medium is on each spool to record 400 total hours on each side. The medium is fireproof, waterproof, and able to withstand severe shocks and vibration. If unusual flight conditions are encour- ., information from the flight recording medium may be used to fac. .ate inspection procedures.

E. The acceleration sensor is mounted in the left main wheelwell near the airplane center of gravity. It is a sealed component which delivers an electrical signal proportional to the forces along its vertical axis. The unit is calibrated to provide signals which are proportional to forces from -3g's to +6g's.

F. A power failure warning light is located on the systems engineer's control panel and indicates a system power failure, a broken foil, or an exhausted recording magazine.

G. A trip and date encoder is installed on the systems engineer's control panel (upper section) and records the trip number and date as a coded series of pulses near the edge of the recording medium. Four thumb switches are used to set in the trip information and two thu- switches are used to set in the date information. An indicator, located on the right side of the face of the encoder, displays the number of hours remaining for the recording medium. A red event button above the indicator is used to mark an encoding pulse on the recording medium to indicate the occurrence of some special event. A black repeat button above the indicator is used to repeat the encoding cycle. An amber indicating light above the indicator shows that the encoding cycle is in progress. The light goes off when the encoding cycle is completed.



Flight Recorder System -- Block Diagram
Figure 1

Printed in U.S.A.

H. The system receives 115-volt, 400-cycle ac power from the flight recorder circuit breaker on the right ac emergency bus and radio bus 3. The system receives 28-volt dc power from the flight recorder circuit breaker on the right dc emergency bus. The system is always energized in flight due to the action of a flight ground relay. A switch is provided on the systems engineer's control panel to bypass the flight ground relay and supply power to the system on the ground.

I. The tape motion sensor provides a time-delay relay margin of safety against false indications. The sensor actuates a relay at the end of a 2-minute delay period to reset and start the cycle from the beginning.

2. To Operate System

A. To Operate System for Flight

(1) Set encoder thumbwheel switches to proper trip and date information.

(2) Energize buses.

(3) Place flight recorder on-off switch in on position. Small neon light directly above time remaining indicator should come on and remain on for duration of encoding cycle.

(4) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(5) Place flight recorder on-off switch in off position. Power is automatically applied to system upon actuation of the flight ground relay when airplane leaves runway.

B. To Operate System on Ground

(1) Energize buses.

(2) Set encoder thumbwheel switches to desired trip and date information.

(3) Place flight recorder on-off switch in on position. Small neon light directly above time remaining indicator should come on and remain on for duration of encoding cycle.

(4) Press push-to-test power failure warning light to ensure integrity of light and to determine that power is available to system.

(5) Press event button to indicate occurrence of event on recording medium.

(6) Press repeat button on trip and date encoder if it is desired to repeat trip and date information.

NOTE: System will operate until on-off switch is placed in off position or until power is removed from buses.

FLIGHT RECORDER SYSTEM - MAINTENANCE PRACTICES

1. General

A. Tests are performed to verify proper operation of all system components. All pitot and static lines are banded for identification.

2. Tools and Equipment Required

NOTE: Equivalent substitutes may be used instead of the following listed items.

Item	Name	Number	Manufacturer	Use
A	Air data calibrator	VPT-10B	Intercontinental Dynamics Corp.	Air data calibration tests
B	Record editor and reader	101024	United Data Control Inc.	Evaluate recorded tracings

3. Adjustment/Test

A. Test Power Failure Warning Light

(1) Check flight recorder unit internally for loose or damaged parts.

(2) Insert magazine, containing spool of recording medium, into recorder unit.

(3) Energize buses.

(4) Place flight recorder on-off switch in on position.

(5) Open flight recorder circuit breaker on right ac emergency bus.

(6) Check that power failure warning light is on.

(7) Pull warning lights dimming switch. Power failure warning light should dim.

(8) Close flight recorder circuit breaker on right ac emergency bus Power failure warning light should go off.

(9) Press in on power failure warning light. Light should come on.

B. Time Remaining Test

(1) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(2) Remove magazine from flight recorder and replace with magazine having empty spool.

(3) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should come on.

(b) Time remaining indicator should indicate 0 to 10 hours.

(4) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(5) Remove magazine from flight recorder and replace existing spool with spool containing known amount of recording medium with minimum recording time of 20 hours.

(6) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should be off.

(b) Time remaining indicator on flight recorder and time remaining indicator on encoder must agree within 10 hours.

C. Encoding Test

(1) Set encoder thumbwheel switches so that digits 999939 are displayed on panel

(2) Press repeat button. Small neon light directly below indicator should come on and remain on for duration of encoding cycle, approximately 15 minutes.

(3) After completion of encoding cycle, press event button any specified number of times. Record should show one start pulse, 48 encoding pulses, one stop pulse, and specified number of event pulses on recording medium.

D. Acceleration Test

(1) Remove mounting screws from accelerometer located in left main gear well.

(2) Place accelerometer in following positions and allow accelerometer to rest in each position for not less than 1 minute.

Accelerometer Physical Position	Accelerometer Position in Degrees	Acceleration in Degrees	Record Position
Connector facing up	0	+1.0 (±0.25)	4.268 (±0.0133)
Connector facing inboard	90	0.0 (±0.25)	4.335 (±0.0133)
Connector facing down	180	-1.0 (±0.25)	4.402 (±0.0133)

(3) Replace accelerometer on mounting bracket and secure with attaching screws.

E. Heading Input Calibration Test

(1) Apply power to gyro compass system and wait 3 minutes for compass system to synchronize.

(2) Set first officer's gyro compass indicator to four cardinal headings: N, E, S, W (±1 degree). Allow indicator to remain at each synchronized heading for not less than 3 minutes and note following record positions:

Heading	Degrees	Record Position
N	360 (±1)	3.220 (±0.0097)
E	90 (±1)	3.785 (±0.0097)
S	180 (±1)	3.220 (±0.0097)
W	270 (±1)	3.655 (±0.0097)

(3) Deenergize gyro compass system.

F. VHF Communications Test

(1) Apply power to both VHF-1 and VHF-2 communications systems.

(2) Key captain's microphone push-to-talk button and hold for 3 minutes. Release button for 2 minutes.

(3) Repeat step (2) several times with captain's and first officer's microphone buttons.

G. Air Data Calibration Test -- Scale Error Test

(1) Connect air data calibrator pressure connection to alternate pitot tube and seal all pitot drain holes with suitable material.

(2) Connect calibrator static fitting to PTC static ports.

CAUTION: POSITIVE PRESSURE IN STATIC LINES MUST NOT EXCEED DIFFERENTIAL PRESSURE OF 1/2 INCH OF MERCURY AT ANY TIME. APPLIED PRESSURES OR DIFFERENTIAL PRESSURES MUST NOT EXCEED 6000-FPM RATE OF CHANGE AT ANY TIME.

(3) With calibrator closed off from ambient pressure, simultaneously adjust calibrator pitot and static pressures to following listed values. Allow calibrator to remain at each test point value for not less than 1 minute.

Inches Hg	Static Altitude	Record Position
28.86	6,000 feet	0.225 (±0.005)
12.64	18,000 feet	1.117 (±0.012)
5.54	40,000 feet	1.582 (±0.012)

Inches Hg	Pitot Air Speed	Record Position
4.814	100 knots	1.787 (±0.006)
4.534	250 knots	2.057 (±0.021)
10.867	450 knots	2.505 (±0.036)

H. Air Data Calibration Test -- System Leak Test

(1) With air data calibrator adjusted to indicate 22,000 feet altitude and 350 knots airspeed, close off pitot and static pressure sources and observe that calibration retains a constant indication, within tolerances listed in step G, for not less than 1 minute.

(2) If system leak rate exceeds allowable tolerances, perform following steps:

(a) If airspeed indication decreases and altitude indication remains constant, check all pitot connections for leaks caused by loose B-nuts, fittings, or cracked flares.

(b) If both airspeed and altitude indications decrease, check all static connections for leaks caused by loose B-nuts, fittings, or cracked flares.

NOTE: If no pitot or static leaks are found, replace flight recorder unit.

(3) Return calibrator to ambient pressure, disconnect pitot and static connections, and remove material used to seal off pitot drain holes.

(4) Place flight recorder on-off switch in off position.

I. Calibration Editing

(1) Remove magazine from flight recorder and replace test spool of recording medium with new spool.

(2) Place test recording medium in record editor and reader, and evaluate recorded tracings for sequential direction and values against input data.

NOTE: Variations of readout values and direction of trace will indicate electrical and phasing continuity.

FLIGHT RECORDER SYSTEM - MAINTENANCE PRACTICES

1. General

A. Tests are performed to verify proper operation of all system components. All pitot and static lines are banded for identification.

2. Tools and Equipment Required

NOTE: Equivalent substitutes may be used instead of the following listed items.

Item	Name	Number	Manufacturer	Use
A	Air data calibrator	VPT-10B	Intercontinental Dynamics Corp.	Air data calibration tests
B	Record editor and reader	101024	United Data Control Inc.	Evaluate recorded tracings

3. Adjustment/Test

A. Test Power Failure Warning Light

(1) Check flight recorder unit internally for loose or damaged parts.

(2) Insert magazine, containing spool of recording medium, into recorder unit.

(3) Energize buses.

(4) Place flight recorder on-off switch in on position.

(5) Open flight recorder circuit breaker on right ac emergency bus.

(6) Check that power failure warning light is on.

(7) Pull warning lights dimming switch. Power failure warning light should dim.

(8) Close flight recorder circuit breaker on right ac emergency bus. Power failure warning light should go off.

(9) Press in on power failure warning light. Light should come on.

B. Time Remaining Test

(1) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(2) Remove magazine from flight recorder and replace with magazine having empty spool.

(3) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should come on.

(b) Time remaining indicator should indicate 0 to 10 hours.

(4) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(5) Remove magazine from flight recorder and replace existing spool with spool containing known amount of recording medium with minimum recording time of 20 hours.

(6) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should be off.

(b) Time remaining indicator on flight recorder and time remaining indicator on encoder must agree within 10 hours.

(7) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

C. Encoding Test

(1) Set encoder thumbwheel switches so that digits 999939 are displayed on panel.

(2) Close flight recorder circuit breakers. Small neon light directly above indicator should come on and remain on for duration of encoding cycle, approximately 15 minutes.

(3) After completion of encoding cycle, press event button any specified number of times. Record should show one start pulse, 48 encoding pulses, one stop pulse, and specified number of event pulses on recording medium.

D. Acceleration Test

(1) Remove mounting screws from accelerometer located in left main gear well.

(2) Place accelerometer in following positions and allow accelerometer to rest in each position for not less than 1 minute.

Accelerometer Physical Position	Accelerometer Position in Degrees	Acceleration in Degrees	Record Position
Connector facing up	0	+1.0 (±0.25)	4.268 (±0.0133)
Connector facing inboard	90	0.0 (±0.25)	4.335 (±0.0133)
Connector facing down	180	-1.0 (±0.25)	4.402 (±0.0133)

(3) Replace accelerometer on mounting bracket and secure with attaching screws.

E. Heading Input Calibration Test

(1) Apply power to gyro compass system and wait 3 minutes for compass system to synchronize.

(2) Set first officer's radio direction indicator to four cardinal headings: N, E, S, W (±1 degree). Allow indicator to remain at each synchronized heading for not less than 3 minutes and note following record positions:

Heading	Degrees	Record Position
N	360 (±1)	3.220 (±0.0097)
E	90 (±1)	3.785 (±0.0097)
S	180 (±1)	3.220 (±0.0097)
W	270 (±1)	3.655 (±0.0097)

(3) Deenergize gyro compass system.

F. Air Data Calibration Test -- Scale Error Test

(1) Connect air data calibrator pressure connection to tail pitot tube and seal all pitot drain holes with suitable material.

(2) Connect calibrator static fitting to alternate static ports.

CAUTION: POSITIVE PRESSURE IN STATIC LINES MUST NOT EXCEED DIFFERENTIAL PRESSURE OF 1/2 INCH OF MERCURY AT ANY TIME. APPLIED PRESSURES OR DIFFERENTIAL PRESSURES MUST NOT EXCEED 6000-FPM RATE OF CHANGE AT ANY TIME.

(3) With calibrator closed off from ambient pressure, simultaneously adjust calibrator pitot and static pressures to following listed values. Allow calibrator to remain at each test point value for not less than 1 minute.

	Static	
Inches Hg	Altitude	Record Position
28.86	6,000 feet	0.225 (±0.005)
12.64	18,000 feet	1.117 (±0.012)
5.54	40,000 feet	1.582 (±0.012)

	Pitot	
Inches Hg	Air Speed	Record Position
4.814	100 knots	1.787 (±0.006)
4.534	250 knots	2.057 (±0.021)
10.867	450 knots	2.505 (±0.036)

G. Air Data Calibration Test -- System Leak Test

(1) With air data calibrator adjusted to indicate 22,000 feet altitude and 350 knots airspeed, close off pitot and static pressure sources and observe that calibration retains a constant indication, within tolerances listed in step F, for not less than 1 minute.

(2) If system leak rate exceeds allowable tolerances, perform following steps:

(a) If airspeed indication decreases and altitude indication remains constant, check all pitot connections for leaks caused by loose B-nuts, fittings, or cracked flares.

(b) If both airspeed and altitude indications decrease, check all static connections for leaks caused by loose B-nuts, fittings, or cracked flares.

NOTE: If no pitot or static leaks are found, replace flight recorder unit.

(3) Return calibrator to ambient pressure, disconnect pitot and static connections, and remove material used to seal off pitot drain holes.

(4) Place flight recorder on-off switch in off position.

H. Calibration Editing

(1) Remove magazine from flight recorder and replace test spool of recording medium with new spool.

(2) Place test recording medium in record editor and reader, and evaluate recorded tracings for sequential direction and values against input data.

NOTE: Variations of readout values and direction of trace will indicate electrical and phasing continuity.

FLIGHT RECORDER SYSTEM - MAINTENANCE PRACTICES

1. General

A. Tests are performed to verify proper operation of all system components. All pitot and static lines are banded for identification.

2. Tools and Equipment Required

NOTE: Equivalent substitutes may be used instead of the following listed items.

Item	Name	Number	Manufacturer	Use
A	Air data calibrator	VPT-10B	Intercontinental Dynamics Corp.	Air data calibration tests
B	Record editor and reader	101024	United Data Control Inc.	Evaluate recorded tracings

3. Adjustment/Test

A. Test Power Failure Warning Light

(1) Check flight recorder unit internally for loose or damaged parts.

(2) Insert magazine, containing spool of recording medium, into recorder unit.

(3) Energize buses.

(4) Place flight recorder on-off switch in on position.

(5) Open flight recorder circuit breaker on right ac emergency bus.

(6) Check that power failure warning light is on.

(7) Pull warning lights dimming switch. Power failure warning light should dim.

(8) Close flight recorder circuit breaker on right ac emergency bus. Power failure warning light should go out.

(9) Press in on power failure warning light. Light should come on.

B. Time Remaining Test

(1) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(2) Remove magazine from flight recorder and replace with magazine having empty spool.

(3) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should come on.

(b) Time remaining indicator should indicate 0 to 10 hours.

(4) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(5) Remove magazine from flight recorder and replace existing spool with spool containing known amount of recording medium with minimum recording time of 20 hours.

(6) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should be off.

(b) Time remaining indicator on flight recorder and time remaining indicator on encoder must agree within 10 hours.

(7) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

C. Encoding Test

(1) Set encoder thumbwheel switches so that digits 999939 are displayed on panel.

(2) Close flight recorder circuit breakers. Small neon light directly below indicator should come on and remain on for duration of encoding cycle, approximately 15 minutes.

(3) After completion of encoding cycle, press event button any specified number of times. Record should show one start pulse 48 encoding pulses, one stop pulse, and specified number of event pulses on recording medium.

D. Acceleration Test

(1) Remove mounting screws from accelerometer located in left main gear well.

(2) Place accelerometer in following positions and allow accelerometer to rest in each position for not less than 1 minute.

Accelerometer Physical Position	Accelerometer Position in Degrees	Acceleration in Degrees	Record Position
Connector facing up	0	+1.0 (±0.25)	4.268 (±0.0133)
Connector facing inboard	90	0.0 (±0.25)	4.335 (±0.0133)
Connector facing down	180	-1.0 (±0.25)	4.402 (±0.0133)

(3) Replace accelerometer on mounting bracket and secure with attaching screws.

E. Heading Input Calibration Test

(1) Apply power to gyro compass system and wait 3 minutes for compass system to synchronize.

(2) Position slave-deslave switch on first officer's panel to slave.

(3) Set first officer's gyro compass indicator to four cardinal headings: N, E, S, W (±1 degree). Allow indicator to remain at each synchronized heading for not less than 3 minutes and note following record positions:

Heading	Degrees	Record Position
N	360 (±1)	3.220 (±0.0097)
E	90 (±1)	3.785 (±0.0097)
S	180 (±1)	3.220 (±0.0097)
W	270 (±1)	3.655 (±0.0097)

(4) Deenergize gyro compass system.

F. Air Data Calibration Test -- Scale Error Test

(1) Connect air data calibrator pressure connection to tail pitot tube and seal all pitot drain holes with suitable material.

(2) Connect calibrator static fitting to auxiliary static ports.

CAUTION: POSITIVE PRESSURE IN STATIC LINES MUST NOT EXCEED DIFFERENTIAL PRESSURE OF 1/2 INCH OF MERCURY AT ANY TIME. APPLIED PRESSURES OR DIFFERENTIAL PRESSURES MUST NOT EXCEED 6000-FPM RATE OF CHANGE AT ANY TIME.

(3) With calibrator closed off from ambient pressure, simultaneously adjust calibrator pitot and static pressures to following listed values. Allow calibrator to remain at each test point value for not less than 1 minute.

Static

Inches Hg	Altitude	Record Position
28.86	6,000 feet	0.225 (±0.005)
12.64	18,000 feet	1.117 (±0.012)
5.54	40,000 feet	1.582 (±0.012)

Pitot

Inches Hg	Air Speed	Record Position
4.814	100 knots	1.787 (±0.006)
4.534	250 knots	2.057 (±0.021)
10.867	450 knots	2.505 (±0.036)

G. Air Data Calibration Test -- System Leak Test

(1) With air data calibrator adjusted to indicate 22,000 feet altitude and 350 knots airspeed, close off pitot and static pressure sources and observe that calibration retains a constant indication, within tolerances listed in step F, for not less than 1 minute.

(2) If system leak rate exceeds allowable tolerances, perform following steps:

(a) If airspeed indication decreases and altitude indication remains constant, check all pitot connections for leaks caused by loose B-nuts, fittings, or cracked flares.

(b) If both airspeed and altitude indications decrease, check all static connections for leaks caused by loose B-nuts, fittings, or cracked flares.

NOTE: If no pitot or static leaks are found, replace flight recorder unit.

(3) Return calibrator to ambient pressure, disconnect pitot and static connections, and remove material used to seal off pitot drain holes.

(4) Place flight recorder on-off switch in off position.

H. Calibration Editing

(1) Remove magazine from flight recorder and replace test spool of recording medium with new spool.

(2) Place test recording medium in record editor and reader, and evaluate recorded tracings for sequential direction and values against input data.

NOTE: Variations of readout values and direction of trace will indicate electrical and phasing continuity.

FLIGHT RECORDER SYSTEM - MAINTENANCE PRACTICES

1. General

   A. Tests are performed to verify proper operation of all system components. All pitot and static lines are banded for identification.

2. Tools and Equipment Required

   NOTE: Equivalent substitutes may be used instead of the following listed items.

Item	Name	Number	Manufacturer	Use
A	Air data calibrator	VPT-10B	Intercontinental Dynamics Corp.	Air data calibration tests
B	Record editor and reader	101024	United Data Control Inc	Evaluate recorded tracings

3. Adjustment/Test

   A. Test Power Failure Warning Light

   (1) Check flight recorder unit internally for loose or damaged parts.

   (2) Insert magazine, containing spool of recording medium, into recorder unit.

   (3) Energize buses.

   (4) Place flight recorder on-off switch in on position.

   (5) Open flight recorder circuit breaker on right ac emergency bus.

   (6) Check that power failure warning light is on.

   (7) Pull warning light dimming switch. Power failure warning light should dim.

   (8) Close flight recorder circuit breaker on right ac emergency bus. Power failure warning light should go off.

   (9) Press in on power failure warning light. Light should come on.

B. Time Remaining Test

(1) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(2) Remove magazine from flight recorder and replace with magazine having empty spool.

(3) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should come on.

(b) Time remaining indicator should indicate 0 to 10 hours.

(4) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(5) Remove magazine from flight recorder and replace existing spool with spool containing known amount of recording medium with minimum recording time of 20 hours.

(6) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should be off.

(b) Time remaining indicator on flight recorder and time remaining indicator on encoder must agree within 10 hours.

C. Acceleration Test

(1) Remove mounting screws from accelerometer located in left main gear well.

(2) Place accelerometer in following positions and allow accelerometer to rest in each position for not less than 1 minute.

Accelerometer Physical Position	Accelerometer Position in Degrees	Acceleration in Degrees	Record Position
Connector facing up	0	+1.0 (±0.25)	4.268 (±0.0133)
Connector facing inboard	90	0.0 (±0.25)	4.335 (±0.0133)
Connector facing down	180	-1.0 (±0.25)	4.402 (±0.0133)

(3) Replace accelerometer on mounting bracket and secure with attaching screws.

D. Heading Input Calibration Test

(1) Apply power to gyro compass system and wait 3 minutes for compass system to synchronize.

(2) Set captain's radio direction indicator to four cardinal headings: N, E, S, W (±1 degree). Allow indicator to remain at each synchronized heading for not less than 3 minutes and note following record positions:

Heading	Degrees	Record Position
N	360 (±1)	3.220 (±0.0097)
E	90 (±1)	3.785 (±0.0097)
S	180 (±1)	3.220 (±0.0097)
W	270 (±1)	3.655 (±0.0097)

(3) Deenergize gyro compass system.

E. Air Data Calibration Test -- Scale Error Test

(1) Connect air data calibration pressure connection to tail pitot tube and seal all pitot drain holes with suitable material.

(2) Connect calibrator static fitting to altern-te static ports.

CAUTION: POSITIVE PRESSURE IN STATIC LINES MUST NOT EXCEED DIFFERENTIAL PRESSURE OF 1/2 INCH OF MERCURY AT ANY TIME. APPLIED PRESSURES OR DIFFERENTIAL PRESSURES MUST NOT EXCEED 6000-FPM RATE OF CHANGE AT ANY TIME.

(3) With calibrator closed off from ambient pressure, simultaneously adjust calibrator pitot and static pressures to following listed values. Allow calibrator to remain at each test point value for not less than 1 minute.

Static		
Inches Hg	Altitude	Record Position
28.86	6,000 feet	0.225 (±0.005)
12.64	18,000 feet	1.117 (±0.012)
5.54	40,000 feet	1.582 (±0.012)

	Pitot	
Inches Hg	Air Speed	Record Position
4.814	100 knots	1.787 (±0.006)
4.534	250 knots	2.057 (±0.021)
10.867	450 knots	2.505 (±0.036)

F. Air Data Calibration Test -- System Leak Test

(1) With air data calibrator adjusted to indicate 22,000 feet altitude and 350 knots airspeed, close off pitot and static pressure sources and observe that calibration retains a constant indication, within tolerances listed in step F, for not less than 1 minute.

(2) If system leak rate exceeds allowable tolerances, perform following steps:

(a) If airspeed indication decreases and altitude indication remains constant, check all pitot connections for leaks caused by loose B-nuts, fittings, or cracked flares.

(b) If both airspeed and altitude indications decrease, check all static connections for leaks caused by loose B-nuts, fittings, or cracked flares.

NOTE: If no pitot or static leaks are found, replace flight recorder unit.

(3) Return calibrator to ambient pressure, disconnect pitot and static connections, and remove material used to seal off pitot drain holes.

(4) Place flight recorder on-off switch in off position.

G. Calibration Editing

(1) Remove magazine from flight recorder and replace test spool of recording medium with new spool.

(2) Place test recording medium in record editor and reader, and evaluate recorded tracings for sequential direction and values against input data.

NOTE: Variations of readout values and direction of trace will indicate electrical and phasing continuity.

FLIGHT RECORDER SYSTEM - MAINTENANCE PRACTICES

1. General

A. Tests are performed to verify proper operation of all system components. All pitot and static lines are banded for identification.

2. Tools and Equipment Required

NOTE: Equivalent substitutes may be used instead of the following listed items.

Item	Name	Number	Manufacturer	Use
A	Air data calibrator	VPT-10B	Intercontinental Dynamics Corp.	Air data calibration tests

3. Adjustment/Test

A. Beep System Test

(1) Check flight recorder unit internally for loose or damaged parts.

(2) Insert magazine, containing spool of recording medium, into recorder unit.

(3) Energize buses.

(4) Press and hold flight recorder ground test switch. Wait five minutes.

(5) Place recorder monitor switch in flight recorder position, and listen for beep signal in systems engineer's headset. Frequency of beep signal increases as recording medium is used up.

(6) Release flight recorder ground test switch. Beep signal should stop.

B. Acceleration Test

(1) Press and hold flight recorder ground test switch.

(2) Remove mounting screws from accelerometer located in left main gear well.

(3) Place accelerometer in following positions and allow accelerometer to rest in each position for not less than 1 minute.

Accelerometer Physical Position	Accelerometer Position in Degrees	Acceleration in Degrees	Record Position
Connector facing up	0	+1.0 (±0.25)	4.268 (±0.0133)
Connector facing inboard	90	0.0 (±0.25)	4.335 (±0.0133)
Connector facing down	180	-1.0 (±0.25)	4.402 (±0.0133)

(4) Replace accelerometer on mounting bracket and secure with attaching screws.

C. Heading Input Calibration Test

(1) Apply power to gyro compass system and wait 3 minutes for compass system to synchronize.

(2) Set first officer's radio direction indicator to four cardinal headings N, E, S, W (±1 degree). Allow indicator to remain at each synchronized heading for not less than 3 minutes and note following record positions:

Heading	Degrees	Record Position
N	360 (±1)	3.220 (±0.0097)
E	90 (±1)	3.785 (±0.0097)
S	180 (±1)	3.220 (±0.0097)
W	270 (±1)	3.655 (±0.0097)

(3) Deenergize gyro compass system.

D. Air Data Calibration Test -- Scale Error Test

(1) Connect air data calibrator pressure connection to tail pitot tube and seal all pitot drain holes with suitable material.

(2) Connect calibration static fitting to alternate static ports.

CAUTION: POSITIVE PRESSURE IN STATIC LINES MUST NOT EXCEED DIFFERENTIAL PRESSURE OF 1/2 INCH OF MERCURY AT ANY TIME. APPLIED PRESSURES OR DIFFERENTIAL PRESSURES MUST NOT EXCEED 6000-FPM RATE OF CHANGE AT ANY TIME.

(3) With calibrator closed off from ambient pressure, simultaneously adjust calibrator pitot and static pressures to following listed values. Allow calibrator to remain at each test point value for not less than 1 minute.

Static

Inches Hg	Altitude	Record Position
28.86	6,000 feet	0.225 (±0.005)
12.64	18,000 feet	1.117 (±0.012)
5.54	40,000 feet	1.582 (±0.012)

Pitot

Inches Hg	Air Speed	Record Position
4.814	100 knots	1.787 (±0.006)
4.534	250 knots	2.057 (±0.021)
10.867	450 knots	2.505 (±0.036)

E. Air Data Calibration Test -- System Leak Test

(1) With air data calibrator adjusted to indicate 22,000 feet altitude and 350 knots airspeed, close off pitot and static pressure sources and observe that calibration retains a constant indication, within tolerances listed in step F, for not less than 1 minute.

(2) If system leak rate exceeds allowable tolerances, perform following steps:

(a) If airspeed indication decreases and altitude indication remains constant, check all pitot connections for leaks caused by loose B-nuts, fittings, or cracked flares.

(b) If both airspeed and altitude indications decrease, check all static connections for leaks caused by loose B-nuts, fittings, or cracked flares.

NOTE: If no pitot or static leaks are found, replace flight recording unit.

(3) Return calibrator to ambient pressure, disconnect pitot and static connections, and remove material used to seal off pitot drain holes.

(4) Release flight recorder ground test switch.

F. Calibration Editing

(1) Examine recorded portion of recording of medium to verify heading, airspeed, and altitude channels have functioned.

NOTE: Deviations from the straight line impressed on the tape indicate the channel is operating.

FLIGHT RECORDER SYSTEM - MAINTENANCE PRACTICES

1. General

A. Tests are performed to verify proper operation of all system components. All pitot and static lines are banded for identification.

2. Tools and Equipment Required

NOTE: Equivalent substitutes may be used instead of the following listed items.

Item	Name	Number	Manufacturer	Use
A	Air data calibrator	VPT-10B	Intercontinental Dyanmic Corp.	Air data calibration tests
B	Record editor and reader	101024	United Data Control Inc.	Evaluate recorded tracings

3. Adjustment/Test

A. Test Power Failure Warning Light

(1) Check flight recorder unit internally for loose or damaged parts.

(2) Insert magazine, containing spool of recording medium, into recorder unit.

(3) Energize buses.

(4) Open flight recorder circuit breaker on right ac emergency bus.

(5) Check that power failure warning light is on.

(6) Pull warning lights dimming switch. Power failure warning light should dim.

(7) Close flight recorder circuit breaker on right ac emergency bus. Power failure warning light should go off.

(8) Press in on power failure warning light. Light should come on.

B. Time Remaining Test

(1) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(2) Remove magazine from flight recorder and replace with magazine having empty spool.

(3) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should come on.

(b) Time remaining indicator should indicate 0 to 10 hours.

(4) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(5) Remove magazine from flight recorder and replace existing spool with spool containing known amount of recording medium with minimum recording time of 20 hours.

(6) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should be off.

(b) Time remaining indicator on flight recorder and time remaining indicator on encoder must agree within 10 hours.

(7) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

C. Encoding Test

(1) Set encoder thumbwheel switches so that digits 999939 are displayed on panel.

(2) Close flight recorder circuit breakers. Small neon light directly above indicator should come on and remain on for duration of encoding cycle, approximately 15 minutes.

(3) After completion of encoding cycle, press event button any specified number of times. Record should show one start pulse, 48 encoding pulses, one stop pulse, and specified number of event pulses on recording medium.

D. Acceleration Test

(1) Remove mounting screws from accelerometer located in left main gear well.

(2) Place accelerometer in following positions and allow accelerometer to rest in each position for not less than 1 minute.

Accelerometer Physical Position	Accelerometer Position in Degrees	Acceleration in Degrees	Record Position
Connector facing up	0	+1.0 (±0.25)	4.268 (±0.0133)
Connector facing inboard	90	0.0 (±0.25)	4.335 (±0.0133)
Connector facing down	180	-1.0 (±0.25)	4.402 (±0.0133)

(3) Replace accelerometer on mounting bracket and secure with attaching screws.

E. Heading Input Calibration Test

(1) Apply power to gyro compass system and wait 3 minutes for compass system to synchronize.

(2) Set first officer's radio direction indicator to four cardinal headings: N, E, S, W (±1 degree). Allow indicator to remain at each synchronized heading for not less than 3 minutes and note following record positions:

Heading	Degrees	Record Position
N	360 (±1)	3.220 (±0.0097)
E	90 (±1)	3.785 (±0.0097)
S	180 (±1)	3.220 (±0.0097)
W	270 (±1)	3.655 (±0.0097)

(3) Deenergize gyro compass system.

F. Air Data Calibration Test -- Scale Error Test

(1) Connect air data calibrator pressure connection to alternate pitot tube and seal all pitot drain holes with suitable material.

(2) Connect calibrator static fitting to PTC static ports.

CAUTION: POSITIVE PRESSURE IN STATIC LINES MUST NOT EXCEED DIFFERENTIAL PRESSURE OF 1/2 INCH OF MERCURY AT ANY TIME. APPLIED PRESSURES OR DIFFERENTIAL PRESSURES MUST NOT EXCEED 6000-FPM RATE OF CHANGE AT ANY TIME.

(3) With calibrator closed off from ambient pressure, simultaneously adjust calibrator pitot and static pressures to following listed values. Allow calibrator to remain at each test point value for not less than 1 minute.

	Static	
Inches Hg	Altitude	Record Position
28.86	6,000 feet	0.225 (±0.005)
12.64	18,000 feet	1.117 (±0.012)
5.54	40,000 feet	1.582 (±0.012)

	Pitot	
Inches	Air Speed	Record Position
4.814	100 knots	1.787 (±0.006)
4.534	250 knots	2.057 (±0.021)
10.867	450 knots	2.505 (±0.036)

G. Air Data Calibration Test -- System Leak Test

(1) With air data calibrator adjusted to indicate 22,000 feet altitude and 350 knots airspeed, close off pitot and static pressure sources and observe that calibration retains a constant indication, within tolerances listed in step F, for not less than 1 minute.

(2) If system leak rate exceeds allowable tolerances, perform following steps:

(a) If airspeed indication decreases and altitude indication remains constant, check all pitot connections for leaks caused by loose B-nuts, fittings, or cracked flares.

(b) If both airspeed and altitude indications decrease, check all static connections for leaks caused by loose B-nuts, fittings, or cracked flares.

NOTE: If no pitot or static leaks are found, replace flight recorder unit.

(3) Return calibrator to ambient pressure, disconnect pitot and static connections, and remove material used to seal off pitot drain holes.

(4) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

H. Calibration Editing

(1) Remove magazine from flight recorder and replace test spool of recording medium with new spool.

(2) Place test recording medium in record editor and reader, and evaluate recorded tracings for sequential direction and values against input data.

NOTE: Variations of readout values and direction of trace will indicate electrical and phasing continuity.

FLIGHT RECORDER SYSTEM - MAINTENANCE PRACTICES

1. General

A. Tests are performed to verify proper operation of all system components. All pitot and static lines are banded for identification.

2. Tools and Equipment Required

NOTE: Equivalent substitutes may be used instead of the following listed items:

Item	Name	Number	Manufacturer	Use
A	Air data calibrator	VPT-10B	Intercontinental Dynamics Corp.	Air data calibration tests
B	Record editor and reader	101024	United Data Control Inc.	Evaluate recorded tracings

3. Adjustment/Test

A. Test Power Failure Warning Light

(1) Check flight recorder unit internally for loose or damaged parts.

(2) Insert magazine, containing spool of recording medium, into recorder unit.

(3) Energize buses.

(4) Place flight recorder on-off switch in on position.

(5) Open flight recorder circuit breaker on right ac emergency bus.

(6) Check that power failure warning light is on.

(7) Pull warning lights dimming switch. Power failure warning light should dim.

(8) Close flight recorder circuit breaker on right ac emergency bus. Power failure warning light should go off.

(9) Press in on power failure warning light. Light should come on.

B. Time Remaining Test

(1) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(2) Remove magazine from flight recorder and replace with magazine having empty spool.

(3) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should come on.

(b) Time remaining indicator should indicate 0 to 10 hours.

(4) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(5) Remove magazine from flight recorder and replace existing spool with spool containing known amount of recording medium with minimum recording time of 20 hours.

(6) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should be off.

(b) Time remaining indicator on flight recorder and time remaining indicator [illegible]coder must agree within 10 hours.

C. Encoding Test

(1) Set encoder thumbwheel switches so that digits 999939 are displayed on panel.

(2) Press repeat button. Small neon light directly below indicator should come on and remain on for duration of encoding cycle, approximately 15 minutes.

(3) After completion of encoding cycle, press event button any specified number of times. Record should show one start pulse, 48 encoding pulses, one stop pulse, and specified number of event pulses on recording medium.

D. Acceleration Test

(1) Remove mounting screws from accelerometer located in left main gear well.

(2) Place accelerometer in following positions and allow accelerometer to rest in each position for not less than 1 minute.

Accelerometer Physical Position	Accelerometer Position in Degrees	Acceleration in Degrees	Record Position
Connector facing up	0	+1.0 (±0.25)	4.268 (±0.0133)
Connector facing inboard	90	0.0 (±0.25)	4.335 (±0.0133)
Connector facing down	180	-1.0 (±0.25)	4.402 (±0.0133)

(3) Replace accelerometer on mounting bracket and secure with attaching screws.

E. Heading Input Calibration Test

(1) Apply power to gyro compass system and wait 3 minutes for compass system to synchronize.

(2) Set first officer's course indicator to four cardinal headings: N, E, S, W (±1 degree). Allow indicator to remain at each synchronized heading for not less than 3 minutes and note following record positions:

Heading	Degrees	Record Position
N	360 (±1)	3.220 (±0.0097)
E	90 (±1)	3.785 (±0.0097)
S	180 (±1)	3.220 (±0.0097)
W	270 (±1)	3.655 (±0.0097)

(3) Deenergize course system.

F. Air Data Calibration Test -- Scale Error Test

(1) Connect air data calibrator pressure connection to tail pitot tube and seal all pitot drain holes with suitable material.

(2) Connect calibrator static fitting to alternate static ports.

CAUTION: POSITIVE PRESSURE IN STATIC LINES MUST NOT EXCEED DIFFERENTIAL PRESSURE OF 1/2 INCH OF MERCURY AT ANY TIME. APPLIED PRESSURES OR DIFFERENTIAL PRESSURES MUST NOT EXCEED 6000-FPM RATE OF CHANGE AT ANY TIME.

(3) With calibrator closed off from ambient pressure, simultaneously adjust calibrator pitot and static pressures to following listed values. Allow calibrator to remain at each test point value for not less than 1 minute.

Inches Hg	Static Altitude	Record Position
28.86	6,000 feet	0.225 (±0.005)
12.64	18,000 feet	1.117 (±0.012)
5.54	40,000 feet	1.582 (±0.012)

Inches Hg	Pitot Air Speed	Record Position
4.814	100 knots	1.787 (±0.006)
4.534	250 knots	2.057 (±0.021)
10.867	450 knots	2.505 (±0.036)

G. Air Data Calibration Test -- System Leak Test

(1) With air data calibrator adjusted to indicate 22,000 feet altitude and 350 knots airspeed, close off pitot and static pressure sources and observe that calibration retains a constant indication, within tolerances listed in step F, for not less than 1 minute.

(2) If system leak rate exceeds allowable tolerances, perform following steps:

(a) If airspeed indication decreases and altitude indication remains constant. check all pitot connections for leaks caused by loose B-nuts, fittings, or cracked flares.

(b) If both airspeed and altitude indications decrease, check all static connections for leaks caused by loose B-nuts, fittings, or cracked flares.

NOTE: If no pitot or static leaks are found, replace flight recorder unit.

(3) Return calibrator to ambient pressure, disconnect pitot and static connections, and remove material used to seal off pitot drain holes.

(4) Place flight recorder on-off switch in off position.

H. Calibration Editing

(1) Remove magazine from flight recorder and replace test spool of recording medium with new spool.

(2) Place test recording medium in record editor and reader, and evaluate recorded tracings for sequential direction and values against input data.

NOTE: Variations of readout values and direction of trace will indicate electrical and phasing continuity.

FLIGHT RECORDER SYSTEM - MAINTENACE PRACTICES

1. General

A. Tests are performed to verify proper operation of all system components. All pitot and static lines are banded for identification.

2. Tools and Equipment Required

NOTE: Equivalent substitutes may be used instead of the following listed items.

Item	Name	Number	Manufacturer	Use
A	Air data calibrator	VPT-10B	Intercontinental Dynamics Corp.	Air data calibration tests
B	Record editor and reader	101024	United Data Control Inc.	Evaluate recorded tracings

3. Adjustment/Test

A. Test Power Failure Warning Light

(1) Check flight recorder unit internally for loose or damaged parts.

(2) Insert magazine, containing spool of recording medium, into recorder unit.

(3) Energize buses.

(4) Place flight recorder on-off switch in on position.

(5) Open flight recorder circuit breaker on right ac emergency bus.

(6) Check that power failure warning light is on.

(7) Pull warning lights dimming switch. Power failure warning light should dim.

(8) Close flight recorder circuit breaker on right ac emergency bus. Power failure warning light should go off.

(9) Press in on power failure warning light. Light should come on.

B. Time Remaining Test

(1) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(2) Remove magazine from flight recorder and replace with magazine having empty spool.

(3) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should come on.

(b) Time remaining indicator should indicate 0 to 10 hours.

(4) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(5) Remove magazine from flight recorder and replace existing spool with spool containing known amount of recording medium with minimum recording time of 20 hours.

(6) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should be off.

(b) Time remaining indicator on flight recorder and time remaining indicator on encoder must agree within 10 hours.

(7) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

C. Acceleration Test

(1) Remove mounting screws from accelerometer located in left main gear well.

(2) Place accelerometer in following positions and allow accelerometer to rest in each position for not less than 1 minute.

Accelerometer Physical Position	Accelerometer Position in Degrees	Acceleration in Degrees	Record Position
Connector facing up	0	+1.0 (±0.25)	4.268 (±0.0133)
Connector facing inboard	90	0.0 (±0.25)	4.335 (±0.0133)
Connector facing down	180	-1.0 (±0.25)	4.402 (±0.0133)

(3) Replace accelerometer on mounting bracket and secure with attaching screws.

D. Heading Input Calibration Test

(1) Apply power to gyro compass system and wait 3 minutes for compass system to synchronize.

(2) Set first officer's radio direction indicator to four cardinal headings: N, E, S, W (±1 degree). Allow indicator to remain at each synchronized heading for not less than 3 minutes and note following record positions:

Heading	Degrees	Record Position
N	360 (±1)	3.220 (±0.0097)
E	90 (±1)	3.785 (±0.0097)
S	180 (±1)	3.220 (±0.0097)
W	270 (±1)	3.655 (±0.0097)

(3) Deenergize gyro compass system.

E. Air Data Calibration Test -- Scale Error Test

(1) Connect air data calibrator pressure connection to tail pitot tube and seal all pitot drain holes with suitable material.

(2) Connect calibrator static fitting to auxiliary static ports.

CAUTION: POSITIVE PRESSURE IN STATIC LINES MUST NOT EXCEED DIFFERENTIAL PRESSURE OF 1/2 INCH OF MERCURY AT ANY TIME. APPLIED PRESSURES OR DIFFERENTIAL PRESSURES MUST NOT EXCEED 6000-FPM RATE OF CHANGE AT ANY TIME.

(3) With calibrator closed off from ambient pressure, simultaneously adjust calibrator pitot and static pressures to following listed values. Allow calibrator to remain at each test point value for not less than 1 minute.

Static		
Inches Hg	Altitude	Record Position
28.86	6,000 feet	0.225 (±0.005)
12.64	18,000 feet	1.117 (±0.012)
5.54	40,000 feet	1.582 (±0.012)

Inches Hg	Pitot Air Speed	Record Position
4.814	100 knots	1.787 (±0.006)
4.534	250 knots	2.057 (±0.021)
10.867	450 knots	2.505 (±0.036)

F. Air Data Calibration Test -- System Leak Test

(1) With air data calibrator adjusted to indicate 22,000 feet altitude and 350 knots airspeed, close off pitot and static pressure sources and observe that calibration retains a constant indication, within tolerances listed in step F, for not less than 1 minute.

(2) If system leak rate exceeds allowable tolerances, perform following steps:

(a) If airspeed indication decreases and altitude indication remains constant, check all pitot connections for leaks caused by loose B-nuts, fittings, or cracked flares.

(b) If both airspeed and altitude indications decrease, check all static connections for leaks caused by loose B-nuts, fittings, or cracked flares.

NOTE: If no pitot or static leaks are found, replace flight recorder unit.

(3) Return calibrator to ambient pressure, disconnect pitot and static connections, and remove material used to seal off pitot drain holes.

(4) Place flight recorder on-off switch in off position.

G. Calibration Editing

(1) Remove magazine from flight recorder and replace test spool of recording medium with new spool.

(2) Place test recording medium in record editor and reader, and evaluate recorded tracings for sequential direction and values against input data.

NOTE: Variations of readout values and direction of trace will indicate electrical and phasing continuity.

FLIGHT RECORDER SYSTEM - MAINTENANCE PRACTICES

1. General

A. Tests are performed to verify proper operation of all system components. All pitot and static lines are banded for identification.

2. Tools and Equipment Required

NOTE: Equivalent substitutes may be used instead of the following listed items.

Item	Name	Number	Manufacturer	Use
A	Air data calibrator	VPT-10B	Intercontinental Dynamics Corp.	Air data calibration tests
B	Record editor and reader	101024	United Data Control Inc.	Evaluate recorded tracings.

3. Adjustment/Test

A. Test Power Failure Warning Light

(1) Check flight recorder unit internally for loose or damaged parts.

(2) Insert magazine, containing spool of recording medium, into recorder unit.

(3) Energize buses.

(4) Place flight recorder on-off switch in on position.

(5) Open flight recorder circuit breaker on right ac emergency bus.

(6) Check that power failure warning light is on.

(7) Pull warning lights dimming switch. Power failure warning light should dim.

(8) Close flight recorder circuit breaker on right ac emergency bus. Power failure warning light should go out.

(9) Press in on power failure [illegible] light. Light should come on.

B. Time Remaining Test

(1) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(2) Remove magazine from flight recorder and replace with magazine having empty spool.

(3) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should come on.

(b) Time remaining indicator should indicate 0 to 10 hours.

(4) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(5) Remove magazine from flight recorder and replace existing spool with spool containing known amount of recording medium with minimum recording time of 20 hours.

(6) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should be off.

(b) Time remaining indicator on flight recorder and time remaining indicator on encoder must agree within 10 hours.

(7) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

C. Encoding Test

(1) Set encoder thumbwheel switches so that digits 999939 are displayed on panel.

(2) Close flight recorder circuit breakers. Small neon light directly below indicator should come on and remain on for duration of encoding cycle, approximately 15 minutes.

(3) After completion of encoding cycle, press event button any specified number of times. Record should show one start pulse, 48 encoding pulses, one stop pulse, and specified number of event pulses on recording medium.

D. Acceleration Test

(1) Remove mounting screws from accelerometer located in left main gear well.

(2) Place accelerometer in following positions and allow accelerometer to rest in each position for not less than 1 minute.

Accelerometer Physical Position	Accelerometer Position in Degrees	Acceleration in Degrees	Record Position
Connector facing up	0	+1.0 (±0.25)	4.268 (±0.0133)
Connector facing inboard	90	0.0 (±0.25)	4.335 (±0.0133)
Connector facing down	180	-1.0 (±0.25)	4.402 (±0.0133)

(3) Replace accelerometer on mounting bracket and secure with attaching screws.

E. Heading Input Calibration Test

(1) Apply power to gyro compass system and wait 3 minutes for compass system to synchronize.

(2) Set first officer's gyro compass indicator to four cardinal headings: N, E, S, W (±1 degree). Allow indicator to remain at each synchronized heading for not less than 3 minutes and note following record positions:

Heading	Degrees	Record Position
N	360 (±1)	3.220 (±0.0097)
E	90 (±1)	3.785 (±0.0097)
S	180 (±1)	3.220 (±0.0097)
W	270 (±1)	3.655 (±0.0097)

(3) Deenergize gyro compass system.

F. Air Data Calibration Test -- Scale Error Test

(1) Connect air data calibrator pressure connection to tail pitot tube and seal all pitot drain holes with suitable material.

(2) Connect calibrator static fitting to auxiliary static ports.

CAUTION: POSITIVE PRESSURE IN STATIC LINES MUST NOT EXCEED DIFFERENTIAL PRESSURE OF 1/2 INCH OF MERCURY AT ANY TIME. APPLIED PRESSURES OR DIFFERENTIAL PRESSURES MUST NOT EXCEED 6000-FPM RATE OF CHANGE AT ANY TIME.

(3) With calibrator closed off from ambient pressure, simultaneously adjust calibrator pitot and static pressures to following listed values. Allow calibrator to remain at each test point value for not less than 1 minute.

Static

Inches Hg	Altitude	Record Position
28.86	6,000 feet	0.225 (±0.005)
12.64	18,000 feet	1.117 (±0.012)
5.54	40,000 feet	1.582 (±0.012)

Pitot

Inches Hg	Air Speed	Record Position
4.814	100 knots	1.787 (±0.006)
4.534	250 knots	2.057 (±0.021)
10.867	450 knots	2.505 (±0.036)

G. Air Data Calibration Test -- System Leak Test

(1) With air data calibrator adjusted to indicate 22,000 feet altitude and 350 knots airspeed, close off pitot and static pressure sources and observe that calibration retains a constant indication, within tolerances listed in Step F, for not less than 1 minute.

(2) If system leak rate exceeds allowable tolerances, perform following steps:

(a) If airspeed indication decreases and altitude indication remains constant, check all pitot connections for leaks caused by loose B-nuts, fittings, or cracked flares.

(b) If both airspeed and altitude indications decrease, check all static connections for leaks caused by loose B-nuts, fittings, or cracked flares.

NOTE: If no pitot or static leaks are found, replace flight recorded unit.

(3) Return calibrator to ambient pressure, disconnect pitot and static connections, and remove material used to seal off pitot drain holes.

(4) Place flight recorder on-off switch in off position.

H. Calibration Editing

(1) Remove magazine from flight recorder and replace test spool of recording medium with new spool.

(2) Place test recording medium in record editor and reader, and evaluate recorded tracings for sequential direction and values against input data.

NOTE: Variations of readout values and direction of trace will indicate electrical and phasing continuity.

FLIGHT RECORDER SYSTEM - MAINTENANCE PRACTICES

1. General

A. Tests are performed to verify proper operation of all system components. All pitot and static lines are banded for identification.

2. Tools and Equipment Required

NOTE: Equivalent substitutes may be used instead of the following listed items.

Item	Name	Number	Manufacturer	Use
A	Air data calibrator	VPT-10B	Intercontinental Dynamics Corp.	Air data calibration tests
B	Record editor and reader	101024	United Data Control, Inc.	Evaluate recorded tracings

3. Adjustment/Test

A. Test Power Failure Warning Light

(1) Check flight recorder unit internally for loose or damaged parts.

(2) Insert magazine, containing spool of recording medium, into recorder unit.

(3) Energize buses.

(4) Place flight recorder on-off switch in on position.

(5) Open flight recorder circuit breaker on left ac emergency bus.

(6) Check that power failure warning light is on.

(7) Pull warning lights dimming switch. Power failure warning light should dim.

(8) Close flight recorder circuit breaker on left ac emergency bus. Power failure warning light should go off

(9) Press in on power failure warning light. Light should come on.

B. Time Remaining Test

(1) Open flight recorder circuit breakers located on left ac and left dc emergency buses.

(2) Remove magazine from flight recorder and replace with magazine having empty spool.

(3) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should come on.

(b) Time remaining indicator should indicate 0 to 10 hours.

(4) Open flight recorder circuit breakers located on left ac and left dc emergency buses.

(5) Remove magazine from flight recorder and replace existing spool with spool containing known amount of recording medium with minimum recording time of 20 hours.

(6) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should be off.

(b) Time remaining indicator on flight recorder and time remaining indicator on encoder must agree within 10 hours.

C. Encoding Test

(1) Set encoder thumbwheel switches so that digits 999939 are displayed on panel.

(2) Press repeat button. Small neon light directly below indicator should come on and remain on for duration of encoding cycle, approximately 15 minutes.

(3) After completion of encoding cycle, press event button any specified number of times. Record should show one start pulse, 48 encoding pulses, one stop pulse, and specified number of event pulses on recording medium.

D. Acceleration Test

(1) Remove mounting screws from accelerometer located in left main gear well.

(2) Place accelerometer in following positions and allow accelerometer to rest in each position for not less than 1 minute.

Accelerometer Physical Position	Accelerometer Position in Degrees	Acceleration in Degrees	Record Position
Connector facing up	0	+1.0 (±0.25)	4.268 (±0.0133)
Connector facing inboard	90	0.0 (±0.25)	4.335 (±0.0133)
Connector facing down	180	-1.0 (±0.25)	4.402 (±0.0133)

(3) Replace accelerometer on mounting bracket and secure with attaching screws.

E. Heading Input Calibration Test

(1) Apply power to gyro compass system and wait 3 minutes for compass system to synchronize.

(2) Set first officer's gyro compass indicator to four cardinal headings: N, E, S, W (± 1 degree). Allow indicator to remain at each synchronized heading for not less than 3 minutes and note following record positions:

Heading	Degrees	Record Position
N	360 (±1)	3.220 (±0.0097)
E	90 (±1)	3.785 (±0.0097)
S	180 (±1)	3.220 (±0.0097)
W	270 (±1)	3.655 (±0.0097)

(3) Deenergize gyro compass system.

F. VHF Communications Test

(1) Apply power to both VHF-1 and VHF-2 communications systems.

(2) Key captain's microphone push-to-talk button and hold for 3 minutes. Release button for 2 minutes.

(3) Repeat step (2) several times with captain's and first officer's microphone buttons.

G. Air Data Calibration Test -- Scale Error Test

(1) Connect air data calibrator pressure connection to alternate pitot tube and seal all pitot drain holes with suitable material.

NOTE: Insure that captain's static selector is in NOR position.

(2) Connect calibrator static fitting to captain's static ports.

CAUTION: SIMULATED PRESSURE IN STATIC LINES MUST NOT EXCEED DIFFERENTIAL PRESSURE OF 10-INCH HEADING BETWEEN PITOT AND STATIC SIMULATED PRESSURES. APPLIED PRESSURES OR DIFFERENTIAL PRESSURES MUST NOT EXCEED 3000-FPM OR 250 KNOTS/MINUTES AT ANY TIME.

(3) Set the captain's altimeter and test equipment altimeter to 29.32-inch heading.

(4) With calibrator closed off from ambient pressure, simultaneously adjust simulated calibrator pitot and static pressures to following listed values. Allow calibrator to remain at each test point value for not less than 1 minute.

Static

Inches Hg	Altitude	Record Position
28.86	6,000 feet	0.351 (±0.004)
12.64	18,000 feet	0.414 (±0.004)
5.54	40,000 feet	1.414 (±0.0158)

Pitot

Inches Hg	Air Speed	Record Position
4.814	100 knots	1.866 (±0.008)
4.534	250 knots	2.126 (±0.0076)
10.867	450 knots	2.462 (±0.0063)

H. Air Data Calibration Test -- System Leak Test

(1) With air data calibrator adjusted to indicate 23,000 feet altitude and 370 knots airspeed, close off pitot and static pressure sources and observe that altimeter does not decrease greater than 100 feet per minute, airspeed does not decrease greater than 5 knots per minute, and calibration retains a constant indication, within tolerances listed in step G, for not less than 1 minute.

(2) If system leak rate exceeds allowable tolerances, perform following steps:

(a) If airspeed indication decreases and altitude indication remains constant, check all pitot connections for leaks caused by loose B-nuts, fittings, or cracked flares.

(b) If both airspeed and altitude indications decrease, check all static connections for leaks caused by loose B-nuts, fittings, or cracked flares.

NOTE: If no pitot or static leaks are found, replace flight recorder unit.

(3) Return calibrator to ambient pressure, disconnect pitot and static connections, and remove material used to seal off pitot drain holes.

(4) Place flight recorder on-off switch in off position.

I. Calibration Editing

(1) Remove magazine from flight recorder and replace test spool of recording medium with new spool.

(2) Place test recording medium in record editor and reader, and evaluate recorded tracings for sequential direction and values against input data.

NOTE: Variations of readout values and direction of trace will indicate electrical and phasing continuity.

FLIGHT RECORDER SYSTEM - MAINTENANCE PRACTICES

1. General

   A. Tests are performed to verify proper operation of all system components. All pitot and static lines are banded for identification.

2. Tools and Equipment Required

   NOTE: Equivalent substitutes may be used instead of the following listed items.

Item	Name	Number	Manufacturer	Use
A	Air data calibrator	VPT-10B	Intercontinental Dynamics Crop.	Air data calibration tests
B	Record editor and reader	101024	United Data Control Inc.	Evaluate recorded tracings

3. Adjustment/Test

   A. Test Power Failure Warning Light

      (1) Check flight recorder unit internally for loose or damaged parts.

      (2) Insert magazine, containing spool of recording medium, into recorder unit.

      (3) Energize buses.

      (4) Open flight recorder circuit breaker on right ac emergency bus.

      (5) Check that power failure warning light is on.

      (6) Pull warning light dimming switch. Power failure warning light should dim.

      (7) Close flight recorder circuit breaker on right ac emergency bus. Power failure warning light should go off.

      (8) Press in on power failure warning light. Light should come on.

B. Time Remaining Test

(1) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(2) Remove magazine from flight recorder and replace with magazine having empty spool.

(3) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should come on.

(b) Time remaining indicator should indicate 0 to 10 hours.

(4) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(5) Remove magazine from flight recorder and replace existing spool with spool containing known amount of recording medium with minimum recording time of 20 hours.

(6) Close flight recorder circuit breakers. Power failure warning light should be off.

C. Acceleration Test

(1) Remove mounting screws from accelerometer located in left main gear well.

(2) Place accelerometer in following positions and allow accelerometer to rest in each position for not less than 1 minute.

Accelerometer Physical Position	Accelerometer Position in Degrees	Acceleration in Degrees	Record Position
Connector facing up	0	+1.0 (±0.25)	4.268 (±0.0133)
Connector facing inboard	90	0.0 (±0.25)	4.335 (±0.0133)
Connector facing down	180	-1.0 (±0.25)	4.402 (±0.0133)

(3) Replace accelerometer on mounting bracket and secure with attaching screws.

D. Heading Input Calibration Test

(1) Apply power to gyro compass system and wait 3 minutes for compass system to synchronize.

(2) Set first officer's radio direction indicator to four cardinal headings: N, E, S, W (±1 degree). Allow indicator to remain at each synchronized heading for not less than 3 minutes and note following record positions:

Heading	Degrees	Record Position
N	360 (±1)	3.220 (±0.0097)
E	90 (±1)	3.785 (±0.0097)
S	180 (±1)	3.220 (±0.0097)
W	270 (±1)	3.655 (±0.0097)

(3) Deenergize gyro compass system.

E. Air Data Calibration Test -- Scale Error Test

(1) Connect air data calibration pressure connection to tail pitot tube and seal all pitot drain holes with suitable material.

(2) Connect calibrator static fitting to alternate static ports.

CAUTION: POSITIVE PRESSURE IN STATIC LINES MUST NOT EXCEED DIFFERENTIAL PRESSURE OF 1/2 INCH OF MERCURY AT ANY TIME. APPLIED PRESSURES OR DIFFERENTIAL PRESSURES MUST NOT EXCEED 6000-FPM RATE OF CHANGE AT ANY TIME.

(3) With calibrator closed off from ambient pressure, simultaneously adjust calibrator pitot and static pressures to following listed values. Allow calibrator to remain at each test point value for not less than 1 minute.

Static Inches Hg	Altitude	Record Position
28.86	6,000 feet	0.225 (±0.005)
12.64	18,000 feet	1.117 (±0.012)
5.54	40,000 feet	1.582 (±0.012)

Inches Hg	Pitot Air Speed	Record Position
4.814	100 knots	1.787 (±0.006)
4.534	250 knots	2.057 (±0.021)
10.867	450 knots	2.505 (±0.036)

F. Air Data Calibration Test -- System Leak Test

(1) With air data calibrator adjusted to indicate 22,000 feet altitude and 350 knots airspeed, close off pitot and static pressure sources and observe that calibration retains a constant indication, within tolerances listed in step F, for not less than 1 minute.

(2) If system leak rate exceeds allowable tolerances, perform following steps:

(a) If airspeed indication decreases and altitude indication remains constant, check all pitot connections for leaks caused by loose E-nuts, fittings, or cracked flares.

(b) If both airspeed and altitude indications decrease, check all static connections for leaks caused by loose B-nuts, fittings, or cracked flares.

NOTE: If no pitot or static leaks are found, replace flight recorder unit.

(3) Return calibrator to ambient pressure, disconnect pitot and static connections, and remove material used to seal off pitot drain holes.

G. Calibration Editing

(1) Remove magazine from flight recorder and replace test spool of recording medium with new spool.

(2) Place test recording medium is record editor and reader, and evaluate recorded tracings for sequential direction and values against input data.

NOTE: Variations of readout values and direction of trace will indicate electrical and phasing continuity.

FLIGHT RECORDER SYSTEM - MAINTENANCE PRACTICES

1. General

A. Tests are performed to verify proper operation of all system components. All pitot and static lines are banded for identification.

2. Tools and Equipment Required

NOTE: Equivalent substitutes may be used instead of the following listed items.

Item	Name	Number	Manufacturer	Use
A	Air data calibrator	VPT-10B	Intercontinental Dynamics Corp.	Air data calibration tests
B	Record editor and reader	101024	United Data Control Inc.	Evaluate recorded tracings

3. Adjustment/Test

A. Test Power Failure Warning Light

(1) Check flight recorder unit internally for loose or damaged parts.

(2) Insert magazine, containing spool of recording medium, into recorder unit.

(3) Energize buses.

(4) Place flight recorder on-off switch in on position.

(5) Open flight recorder circuit breaker on right ac emergency bus.

(6) Check that power failure warning light is on.

(7) Pull warning lights dimming switch. Power failure warning light should dim.

(8) Close flight recorder circuit breaker on right ac emergency bus. Power failure warning light should go off.

(9) Press in on power failure warning light. Light should come on.

B. Time Remaining Test

(1) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(2) Remove magazine from flight recorder and replace with magazine having empty spool.

(3) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should come on.

(b) Time remaining indicator should indicate 0 to 10 hours.

(4) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(5) Remove magazine from flight recorder and replace existing spool with spool containing known amount of recording medium with minimum recording time of 20 hours.

(6) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should be off.

(b) Time remaining indicator on flight recorder and time remaining indicator on encoder must agree within 10 hours.

(7) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

C. Encoding Test

(1) Set encoder thumbwheel switches so that digits 999939 are displayed on panel.

(2) Close flight recorder circuit breakers. Small neon light directly above indicator should come on and remain on for duration of encoding cycle, approximately 15 minutes.

(3) After completion of encoding cycle, press event button any specified number of times. Record should show one start pulse, 48 encoding pulses, one stop pulse, and specified number of event pulses on recording medium.

D. Acceleration Test

(1) Remove mounting screws from accelerometer located in left main gear well.

(2) Place accelerometer in following positions and allow accelerometer to rest in each position for not less than 1 minute.

Accelerometer Physical Position	Accelerometer Position in Degrees	Acceleration in Degrees	Record Position
Connector facing up	0	+1.0 (±0.25)	4.268 (±0.0133)
Connector facing inboard	90	0.0 (±0.25)	4.335 (±0.0133)
Connector facing down	180	-1.0 (±0.25)	4.402 (±0.0133)

(3) Replace accelerometer on mounting bracket and secure with attaching screws.

E. Heading Input Calibration Test

(1) Apply power to gyro compass system and wait 3 minutes for compass system to synchronize.

(2) Set first officer's radio direction indicator to four cardinal headings: N, E, S, W (±1 degree). Allow indicator to remain at each synchronized heading for not less than 3 minutes and note following record positions:

Heading	Degrees	Record Position
N	360 (±1)	3.220 (±0.0097)
E	90 (±1)	3.785 (±0.0097)
S	180 (±1)	3.220 (±0.0097)
W	270 (±1)	3.655 (±0.0097)

(3) Deenergize gyro compass system.

F. Air Data Calibration Test -- Scale Error Test

(1) Connect air data calibrator pressure connection to alternate pitot tube and seal all pitot drain holes with suitable material.

(2) Connect calibrator static fitting to PTC static ports.

CAUTION: POSITIVE PRESSURE IN STATIC LINES MUST NOT EXCEED DIFFERENTIAL PRESSURE OF 1/2 INCH OF MERCURY AT ANY TIME. APPLIED PRESSURES OR DIFFERENTIAL PRESSURES MUST NOT EXCEED 6000-FPM RATE OF CHANGE AT ANY TIME.

(3) With calibrator closed off from ambient pressure, simultaneously adjust calibrator pitot and static pressures to following listed values. Allow calibrator to remain at each test point value for not less than 1 minute.

Static

Inches Hg	Altitude	Record Position
28.86	6,000 feet	0.225 (±0.005)
12.64	18,000 feet	1.117 (±0.012)
5.54	40,000 feet	1.582 (±0.012)

Pitot

Inches Hg	Air Speed	Record Position
4.814	100 knots	1.787 (±0.006)
4.534	250 knots	2.057 (±0.021)
10.867	450 knots	2.505 (±0.036)

G. Air Data Calibration Test -- System Leak Test

(1) With air data calibrator adjusted to indicate 22,000 feet altitude and 350 knots airspeed, close off pitot and static pressure sources and observe that calibration retains a constant indication, within tolerances listed in step F, for not less than 1 minute.

(2) If system leak rate exceeds allowable tolerances, perform following steps:

(a) If airspeed indication decreases and altitude indication remains constant, check all pitot connections for leaks caused by loose B-nuts, fittings, or cracked flares.

(b) If both airspeed and altitude indications decrease, check all static connections for leaks caused by loose B-nuts, fittings, or cracked flares.

<u>NOTE</u>: If no pitot or static leaks are found, replace flight recorder unit.

(3) Return calibrator to ambient pressure, disconnect pitot and static connections, and remove material used to seal off pitot drain holes.

(4) Place flight recorder on-off switch in off position.

H. Calibration Editing

(1) Remove magazine from flight recorder and replace test spool of recording medium with new spool.

(2) Place test recording medium in record editor and reader, and evaluate recorded tracings for sequential direction and values against input data.

<u>NOTE</u>: Variations of readout values and direction of trace will indicate electrical and phasing continuity.

FLIGHT RECORDER SYSTEM - MAINTENANCE PRACTICES

1. General

   A. Tests are performed to verify proper operation of all system components. All pitot and static lines are banded for identification.

2. Tools and Equipment Required

   NOTE: Equivalent substitutes may be used instead of the following listed items.

Item	Name	Number	Manufacturer	Use
A	Air data calibrator	VPT-10B	Intercontinental Dynamic Corp.	Air data calibration tests
B	Record editor and reader	101024	United Data Control Inc.	Evaluate recorded tracings

3. Adjustment/Test

   A. Test Power Failure Warning Light

      (1) Check flight recorder unit internally for loose or damaged parts.

      (2) Insert magazine, containing spool of recording medium, into recorder unit.

      (3) Energize buses.

      (4) Open flight recorder circuit breaker on right ac emergency bus.

      (5) Check that power failure warning light is on.

      (6) Pull warning lights dimming switch. Power failure warning light should dim.

      (7) Close flight recorder circuit breaker on right ac emergency bus. Power failure warning light should go off.

      (8) Press in on power failure warning light. Light should come on.

B. Time Remaining Test

(1) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(2) Remove magazine from flight recorder and replace with magazine having empty spool.

(3) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should come on.

(b) Time remaining indicator should indicate 0 to 10 hours.

(4) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(5) Remove magazine from flight recorder and replace existing spool with spool containing known amount of recording medium with minimum recording time of 20 hours.

(6) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should be off.

(b) Time indicator on flight recorder and time remaining indicator on encoder must agree within 10 hours.

(7) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

C. Encoding Test

(1) Set encoder thumbwheel switches so that digits 999939 are displayed on panel.

(2) Close flight recorder circuit breakers. Small neon light directly above indicator should come on and remain on for duration of encoding cycle, approximately 15 minutes.

(3) After completion of encoding cycle, press event button any specified number of times. Record should show one start pulse, 48 encoding pulses, one stop pulse, and specified number of event pulses on recording medium.

D. Acceleration Test

(1) Remove mounting screws from accelerometer located in left main gear well.

(2) Place accelerometer in following positions and allow accelerometer to rest in each position for not less than 1 minute.

Accelerometer Physical Position	Accelerometer Position in Degrees	Acceleration in Degrees	Record Position
Connector facing up	0	+1.0 (±0.25)	4.268 (±0.0133)
Connector facing inboard	90	0.0 (±0.25)	4.335 (±0.0133)
Connector facing down	180	-1.0 (±0.25)	4.402 (±0.0133)

(3) Replace accelerometer on mounting bracket and secure with attaching screws.

E. Heading Input Calibration Test

(1) Apply power to gyro compass system and wait 3 minutes for compass system to synchronize.

(2) Set first officer's radio direction indicator to four cardinal headings: N, E, S, W (±1 degree). Allow indicator to remain at each synchronized heading for not less than 3 minutes and note following record positions:

Heading	Degrees	Record Position
N	360 (±1)	3.220 (±0.0097)
E	90 (±1)	3.785 (±0.0097)
S	180 (±1)	3.220 (±0.0097)
W	270 (±1)	3.655 (±0.0097)

(3) Deenergize gyro compass system.

F. Air Data Calibration Test -- Scale Error Test

(1) Connect air data calibrator pressure connection to tail pitot tube and seal all pitot drain holes with suitable material.

(2) Connect calibrator static fitting to alternate static ports.

CAUTION: POSITIVE PRESSURE IN STATIC LINES MUST NOT EXCEED DIFFERENTIAL PRESSURE OF 1/2 INCH OF MERCURY AT ANY TIME. APPLIED PRESSURES OR DIFFERENTIAL PRESSURES MUST NOT EXCEED 6000-FPM RATE OF CHANGE AT ANY TIME.

(3) With calibrator closed off from ambient pressure, simultaneously adjust calibrator pitot and static pressures to following listed values. Allow calibrator to remain at each test point value for not less than 1 minute.

Static

Inches Hg	Altitude	Record Position
28.86	6,000 feet	0.225 (±0.005)
12.64	18,000 feet	1.117 (±0.012)
5.54	40,000 feet	1.582 (±0.012)

Pitot

Inches	Air Speed	Record Position
4.814	100 knots	1.787 (±0.006)
4.534	250 knots	2.057 (±0.021)
10.867	450 knots	2.505 (±0.036)

G. Air Data Calibration Test -- System Leak Test

(1) With air data calibrator adjusted to indicate 22,000 feet altitude and 350 knots airspeed, close off pitot and static pressure sources and observe that calibration retains a constant indication, within tolerances listed in paragraph F, for not less than 1 minute.

(2) If system leak rate exceeds allowable tolerances, perform following steps:

(a) If airspeed indication decreases and altitude indication remains constant, check all pitot connections for leaks caused by loose B-nuts, fittings, or cracked flares.

(b) If both airspeed and altitude indications decrease, check all static connections for leaks caused by loose B-nuts, fittings, or cracked flares.

NOTE: If no pitot or static leaks are found, replace flight recorder unit.

(3) Return calibrator to ambient pressure, disconnect pitot and static connections, and remove material used to seal off pitot drain holes.

(4) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

H. Calibration Editing

(1) Remove magazine from flight recorder and replace test spool of recording medium with new spool.

(2) Place test recording medium in record editor and reader, and evaluate recorded tracings for sequential direction and values against input data.

NOTE: Variations of readout values and direction of trace will indicate electrical and phasing continuity.

FLIGHT RECORDER SYSTEM - MAINTENANCE PRACTICES

1. General

A. Tests are performed to verify proper operation of all system components. All pitot and static lines are banded for identification.

2. Tools and Equipment Required

NOTE: Equivalent substitutes may be used instead of the following listed items.

Item	Name	Number	Manufacturer	Use
A	Air data calibrator	VPT-10B	Intercontinental Dynamics Corp.	Air data calibration tests
B	Record editor and reader	101024	United Data Control Inc.	Evaluate recorded tracings

3. Adjustment/Test

A. Test Power Failure Warning Light

(1) Check flight recorder unit internally for loose or damaged parts.

(2) Insert magazine, containing spool of recording medium, into recorder unit.

(3) Energize buses.

(4) Place flight recorder on-off switch in on position.

(5) Open flight recorder circuit breaker on right ac emergency bus.

(6) Check that power failure warning light is on.

(7) Pull warning light dimming switch. Power failure warning light should dim.

(8) Close flight recorder circuit breaker on right ac emergency bus. Power failure warning light should go off.

(9) Press in on power failure warning light. Light should come on.

B. Time Remaining Test

(1) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(2) Remove magazine from flight recorder and replace with magazine having empty spool.

(3) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should come on.

(b) Time remaining indicator should indicate 0 to 10 hours.

(4) Open flight recorder circuit breakers located on right ac and right dc emergency buses.

(5) Remove magazine from flight recorder and replace existing spool with spool containing known amount of recording medium with minimum recording time of 20 hours.

(6) Close flight recorder circuit breakers and monitor following conditions:

(a) Power failure warning light should be off.

(b) Time remaining indicator on flight recorder and time remaining indicator on encoder must agree within 10 hours.

C. Acceleration Test

(1) Remove mounting screws from accelerometer located in left main gear well.

(2) Place accelerometer in following positions and allow accelerometer to rest in each position for not less than 1 minute.

Accelerometer Physical Position	Accelerometer Position in Degrees	Acceleration in Degrees	Record Position
Connector facing up	0	+1.0 (±0.25)	4.268 (±0.0133)
Connector facing inboard	90	0.0 (±0.25)	4.335 (±0.0133)
Connector facing down	180	-1.0 (±0.25)	4.402 (±0.0133)

(3) Replace accelerometer on mounting bracket and secure with attaching screws.

D. Heading Input Calibration Test

(1) Apply power to gyro compass system and wait 3 minutes for compass system to synchronize.

(2) Set first officer's compass indicator to four cardinal headings: N, E, S, W (±1 degree). Allow indicator to remain at each synchronized heading for not less than 3 minutes and note following record positions:

Heading	Degrees	Record Position
N	360 (±1)	3.220 (±0.0097)
E	90 (±1)	3.785 (±0.0097)
S	180 (±1)	3.220 (±0.0097)
W	270 (±1)	3.655 (±0.0097)

(3) Deenergize gyro compass system.

E. Air Data Calibration Test -- Scale Error Test

(1) Connect air data calibration pressure connection to tail pitot tube and seal all pitot drain holes with suitable material.

(2) Connect calibrator static fitting to alternate static ports.

<u>CAUTION:</u> POSITIVE PRESSURE IN STATIC LINES MUST NOT EXCEED DIFFERENTIAL PRESSURE OF 1/2 INCH OF MERCURY AT ANY TIME. APPLIED PRESSURES OR DIFFERENTIAL PRESSURES MUST NOT EXCEED 6000-FPM RATE OF CHANGE AT ANY TIME.

(3) With calibrator closed off from ambient pressure, simultaneously adjust calibrator pitot and static pressures to following listed values. Allow calibrator to remain at each test point value for not less than 1 minute.

Inches Hg	Static Altitude	Record Position
28.86	6,000 feet	0.225 (±0.005)
12.64	18,000 feet	1.117 (±0.012)
5.54	40,000 feet	1.582 (±0.012)

Inches Hg.	Pitot Air Speed	Record Position
4.814	100 knots	1.787 (±0.006)
4.534	250 knots	2.057 (±0.021)
10.867	450 knots	2.505 (±0.036)

F. Air Data Calibration Test -- System Leak Test

(1) With air data calibrator adjusted to indicate 22,000 feet altitude and 350 knots airspeed, close off pitot and static pressure sources and observe that calibration retains a constant indication, within tolerances listed in step F, for not less than 1 minute.

(2) If system leak rate exceeds allowable tolerances, perform following steps:

(a) If airspeed indication decreases and altitude indication remains constant, check all pitot connections for leaks caused by loose B-nuts, fittings, or cracked flares.

(b) If both airspeed and altitude indications decrease, check all static connections for leaks caused by loose B-nuts, fittings, or cracked flares.

NOTE: If no pitot or static leaks are found, replace flight recorder unit.

(3) Return calibrator to ambient pressure, disconnect pitot and static connections, and remove material used to seal off pitot drain holes.

(4) Place flight recorder on-off switch in off position.

G. Calibration Fitting

(1) Remove magazine from flight recorder and replace test spool of recording medium with new spool.

(2) Place test recording medium in record editor and reader, and evaluate recorded tracings for sequential direction and values against input data.

NOTE: Variations of readout values and direction of trace will indicate electrical and phasing continuity.

FLIGHT RECORDER - SERVICING

1. General

   A. The flight recorder is located above the aft cabin ceiling. Servicing the flight recorder consists of replacement of the recording medium.

2. Servicing Flight Recorder

   A. Remove Recording Medium

      (1) Open the flight recorder circuit breakers located on main circuit breaker panel.

      WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

      (2) Open front door panel.

      (3) Lift latch handle and remove magazine from the flight recorder.

      (4) Position magazine with knob up and gears on shafts facing right.

      (5) Rotate the knob clockwise and open magazine door.

      (6) Wind any remaining medium onto spool by rotating spool clockwise.

      (7) Lift up the ratchet located at the right of the spool and rotate clockwise for one revolution.

      (8) Disengage ratchet and rotate takeup shaft counterclockwise while holding spool stationary; remove shaft from spool.

      (9) Remove spool from magazine.

      (10) Tape end of medium to prevent unwinding and identify spool with pertinate information.

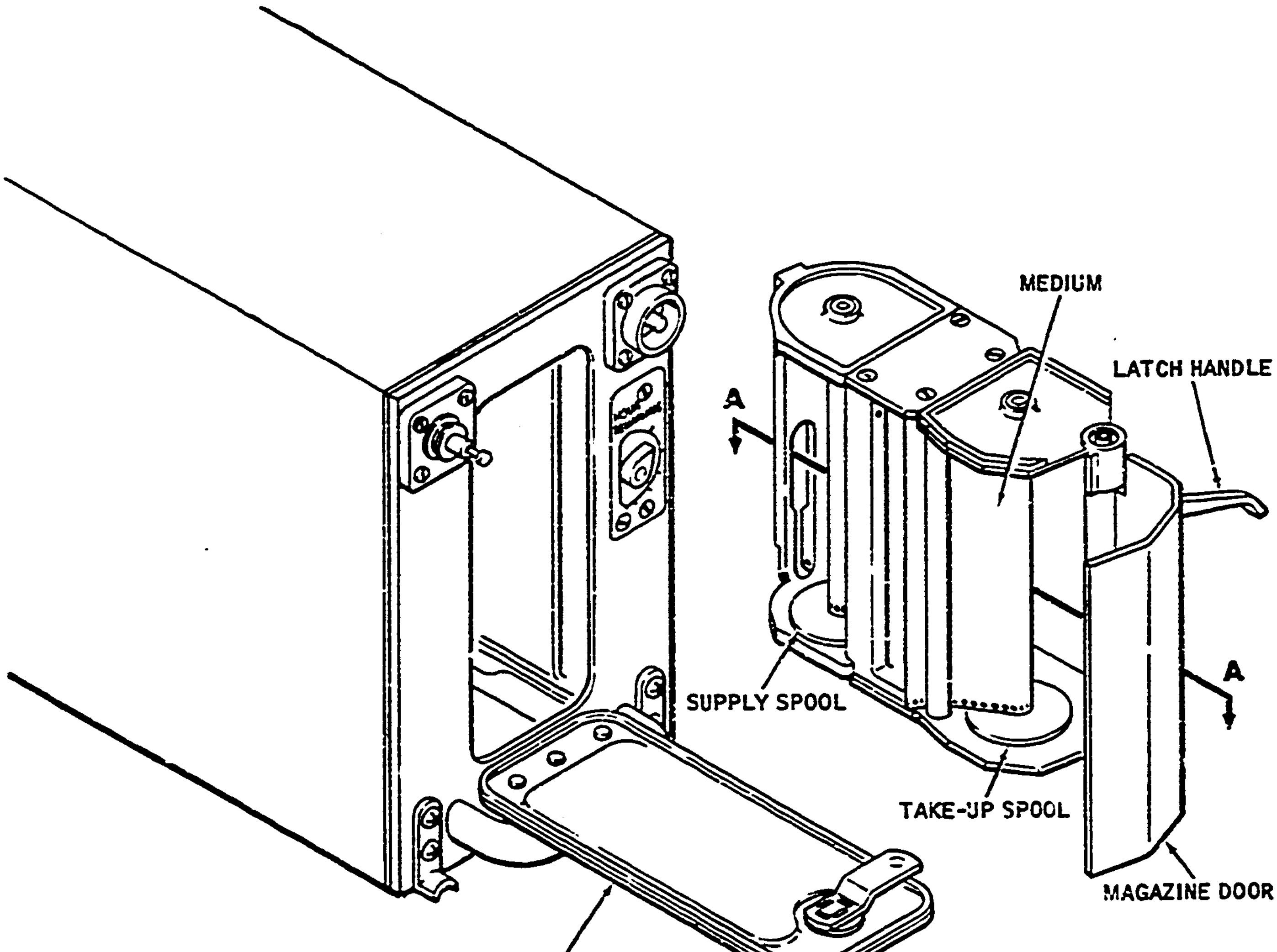
   B. Install Recording Medium

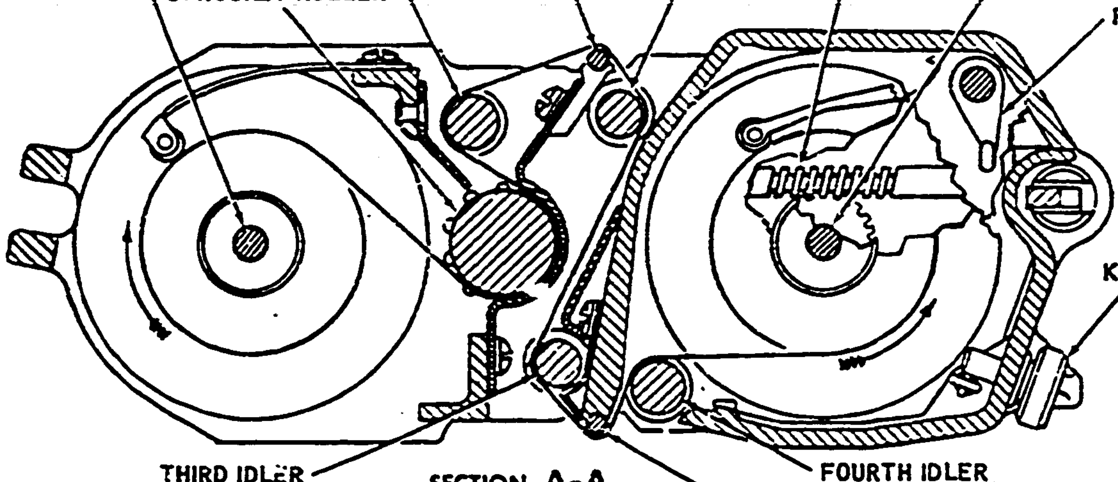
      (1) Install gears on sprocket roller and takeup drive shaft.

      (2) Position spool of medium in magazine with tapered hole in end facing left.

      CAUTION: USE EXTREME CARE WHEN INSTALLING SHAFT TO PREVENT DAMAGE TO BEARING.

      (3) Install supply spool shaft through spool of medium until gear engages the timer drive shaft.





Flight Recorder Servicing
Figure 1

(4) Hand rotate shaft clockwise until left end engages hex slot of the drag plate.

(5) Pull out and expose approximately six inches of the medium.

(6) Feed the medium around the sprocket roller to engage at least two pins. Continue to rotate until the medium is wrapped around half sprocket roller.

(7) Position magazine on end opposite gears and continue to rotate gear clockwise until medium comes through approximately six inches on near side of first idler roller.

(8) Trim corners and feed medium around scribe roller, then around far side of second idler roller. Continue to opposite side of magazine around third idler roller.

(9) Reposition magazine to step 1 position.

(10) Rotate sprocket roller clockwise and feed medium between second scribe roller and fourth idler roller until six inches of medium extends beyond the roller.

(11) Secure medium with cellophane tape to the spool with tapered hole in end facing left.

(12) Turn medium spool approximately two turns loosely winding the slack medium onto the spool.

CAUTION: USE EXTREME CARE WHEN INSTALLING THE SHAFT TO PREVENT BEARING DAMAGE.

(13) Position spool in magazine and insert takeup drive shaft until threads engage timer drive shaft.

(14) Rotate shaft clockwise until shaft engages bearing. Disengage ratchet and complete tightening shaft.

(15) Release ratchet; engage shaft and gear then continue to rotate shaft until all slack on medium is taken up.

(16) Turn shaft six more revolutions and observe alignment of spool and sprocket holes.

(17) Rotate knob clockwise and gently close door.

(18) Install magazine in the flight recorder and secure with latch lever.

(19) Close front panel door.

(20) Close flight recorder circuit breakers and remove warning signs.

FLIGHT RECORDER - SERVICING

1. General

   A. The flight recorder is located above the aft cabin ceiling. Servicing the flight recorder consists of replacing the medium.

2. Servicing Flight Recorder

   A. Remove Recording Medium

      (1) Open flight recorder circuit breakers located on main circuit breaker panel.

      WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

      (2) Open front door panel.

      (3) Lift latch handle and remove magazine from flight recorder.

      (4) Position magazine with knob up and gears on shafts facing right.

      (5) Press in extractor and open magazine door.

      (6) Wind any remaining medium onto spool by rotating spool clockwise.

      (7) Unscrew supply spool shaft and remove from magazine.

      (8) Depress pawl and unscrew takeup shaft; remove shaft spool.

      (9) Remove spool from magazine.

      (10) Tape end of medium to prevent unwinding and identify spool with pertinent information.

   B. Install Recording Medium

      (1) Position spool of medium in magazine.

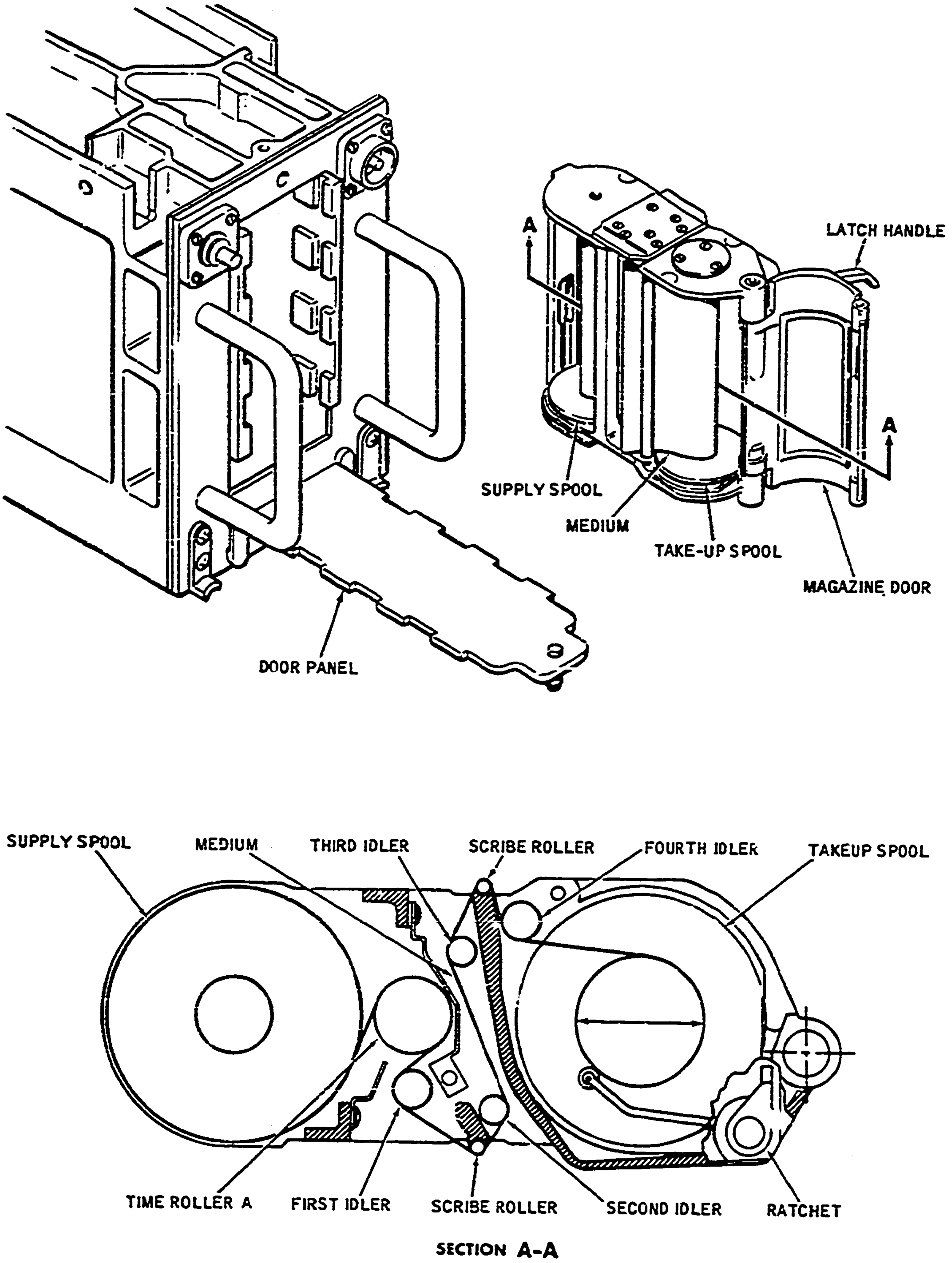
      WARNING: HANDLE MEDIUM WITH CARE TO AVOID INJURY TO HANDS.

      (2) Install supply spool shaft through spool of medium until flats engage spring locks.

      (3) Hand rotate shaft clockwise until secured in magazine.

      (4) Pull out and expose approximately 12 inches of medium.

      (5) Feed medium around sprocket roller to engage at least two pins. Continue to rotate until medium is wrapped around half of sprocket roller.



Flight Recorder Medium Replacement
Figure 301

(6) Position magazine on end opposite gears and continue to rotate gear clockwise until medium comes through approximately six inches on near side of first idler roller.

(7) Trim corners and feed medium around scribe, then around far side of second idler roller. Continue to opposite side of magazine and around third idler roller.

(8) Reposition magazine with gear facing upward.

(9) Rotate sprocket roller clockwise and feed medium around scribe roller and fourth idler roller until six inches of medium extends beyond roller.

NOTE: The medium feeds under the fourth idler roller.

(10) Insert medium into slot in takeup spool and secure with tape.

(11) Turn medium spool approximately two turns loosely winding loose medium onto spool.

CAUTION: VERIFY THAT THE SPROCKET PROPERLY ENGAGES THE MEDIUM WITHOUT ANY DISTORTION TO THE HOLES IN MEDIUM.

(12) Position spool in magazine and insert takeup drive shaft until pawl engages timer gear assembly.

(13) Turn shaft six more turns and observe alignment of spool and sprocket holes.

(14) Close magazine door.

(15) Install magazine in flight recorder and secure with latch lever.

(16) Close front door panel and lock by pressing downward and engaging pin in recorder frame.

(17) Close flight recorder circuit breakers and remove warning signs.

FLIGHT RECORDER - SERVICING

1. General

A. The flight recorder is located on a mount in the tail compartment. Servicing the flight recorder consists of replacement of the recording medium. To gain access see figure 1 page 402.

2. Servicing Flight Recorder

A. Remove Recording Medium

(1) Open flight recorder circuit breakers located on main circuit breaker panel.

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

(2) Unlatch and remove cover assembly.

(3) Turn wing bolt counter clockwise to loosen magazine assembly.

(4) Hold each spool with thumb, tilt medium away from styli and remove magazine from mounting plate.

(5) Manually turn takeup spool winding all medium on takeup spool.

(6) Lift locking latches from spool and turn parallel with spool shaft.

(7) Remove spools and medium from spool shafts.

B. Install Recording Medium

(1) Place empty spool on the takeup shaft.

(2) Unroll approximately six inches of medium and install full spool on the supply shaft.

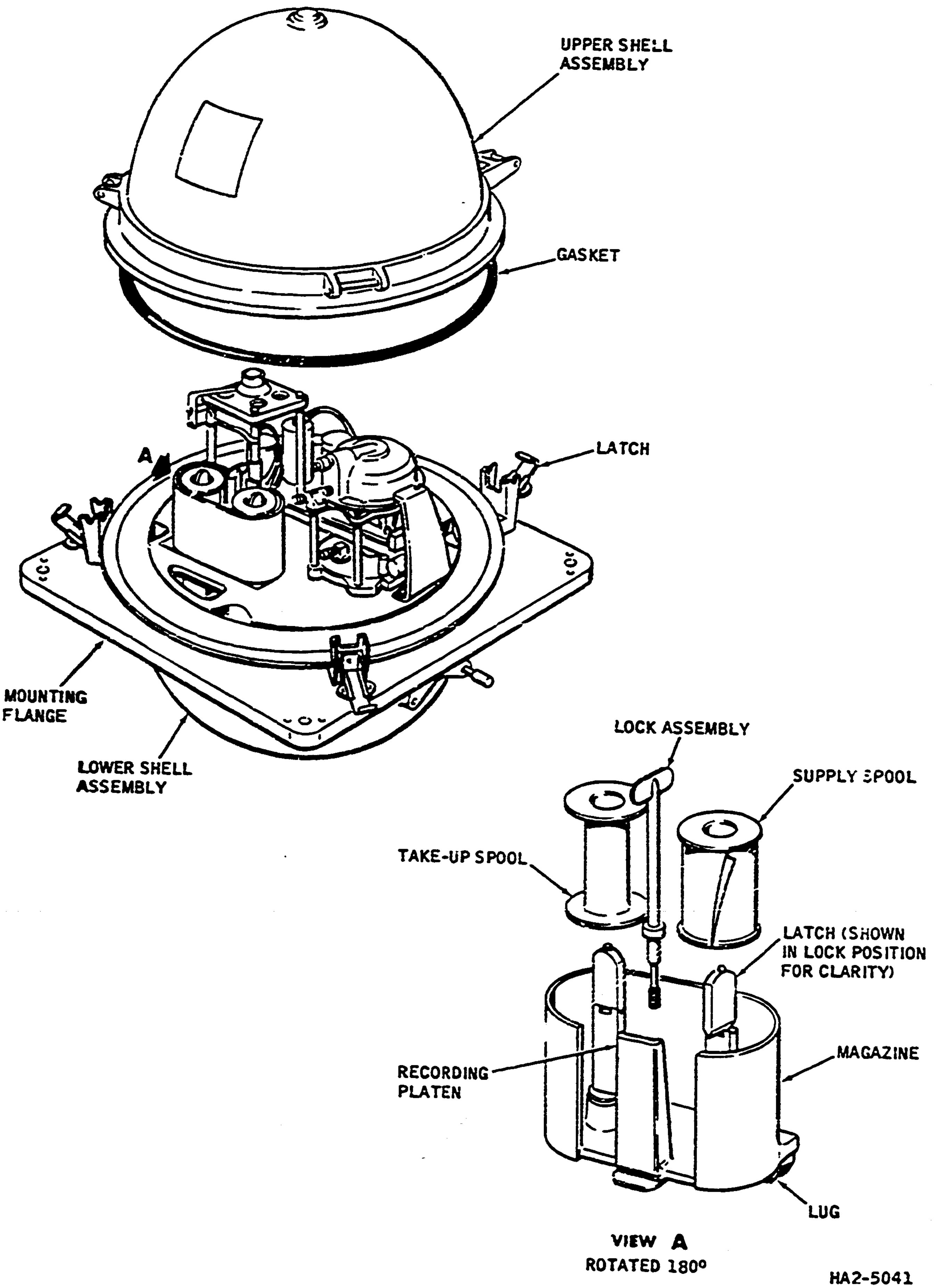
(3) Turn shaft latches to locked position and secure spools.

(4) Extend medium from supply spool over platen to takeup spool. Secure medium with tape to takeup spool.

(5) Rotate takeup spool at least two turns.

CAUTION: TILT MAGAZINE AWAY FROM STYLI WHEN INSTALLING ON THE MOUNTING PLATE. DAMAGE TO STYLI COULD RESULT.

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Flight Recorder Medium Replacement
Figure 301

(6) Prevent spools from turning and install magazine assembly on mounting plate.

<u>CAUTION</u>: ENSURE THAT PAWL AND SPROCKET ON UNDERSIDE OF MAGAZINE ASSEMBLY ARE ENGAGED. MANUALLY ROTATE TAKEUP SPOOL IN REVERSE DIRECTION.

(7) Position magazine towards styli and secure with lock assembly.

(8) Replace cover and secure with latches.

(9) Close flight recorder circuit breakers and remove warning signs.

FLIGHT RECORDER - SERVICING

1. General

A. The flight recorder is located on shelf six of radio rack. Servicing the flight recorder consists of replacing the recording medium.

2. Servicing Flight Recorder

A. Remove Recording Medium

(1) Open flight recorder circuit breakers located on main circuit breaker panel.

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

(2) Open front door panel.

(3) Lift latch handle and remove magazine from flight recorder.

(4) Position magazine with knob up and gears on shafts facing right.

(5) Rotate knob clockwise and open magazine door.

(6) Wind any remaining medium onto spool by rotating spool clockwise.

(7) Lift up ratchet located at right of spool and rotate clockwise for one revolution.

(8) Disengage ratchet and rotate takeup shaft counterclockwise while holding spool stationary; remove shaft from spool.

(9) Remove spool from magazine.

(10) Tape end of medium to prevent unwinding and identify spool with pertinent information.

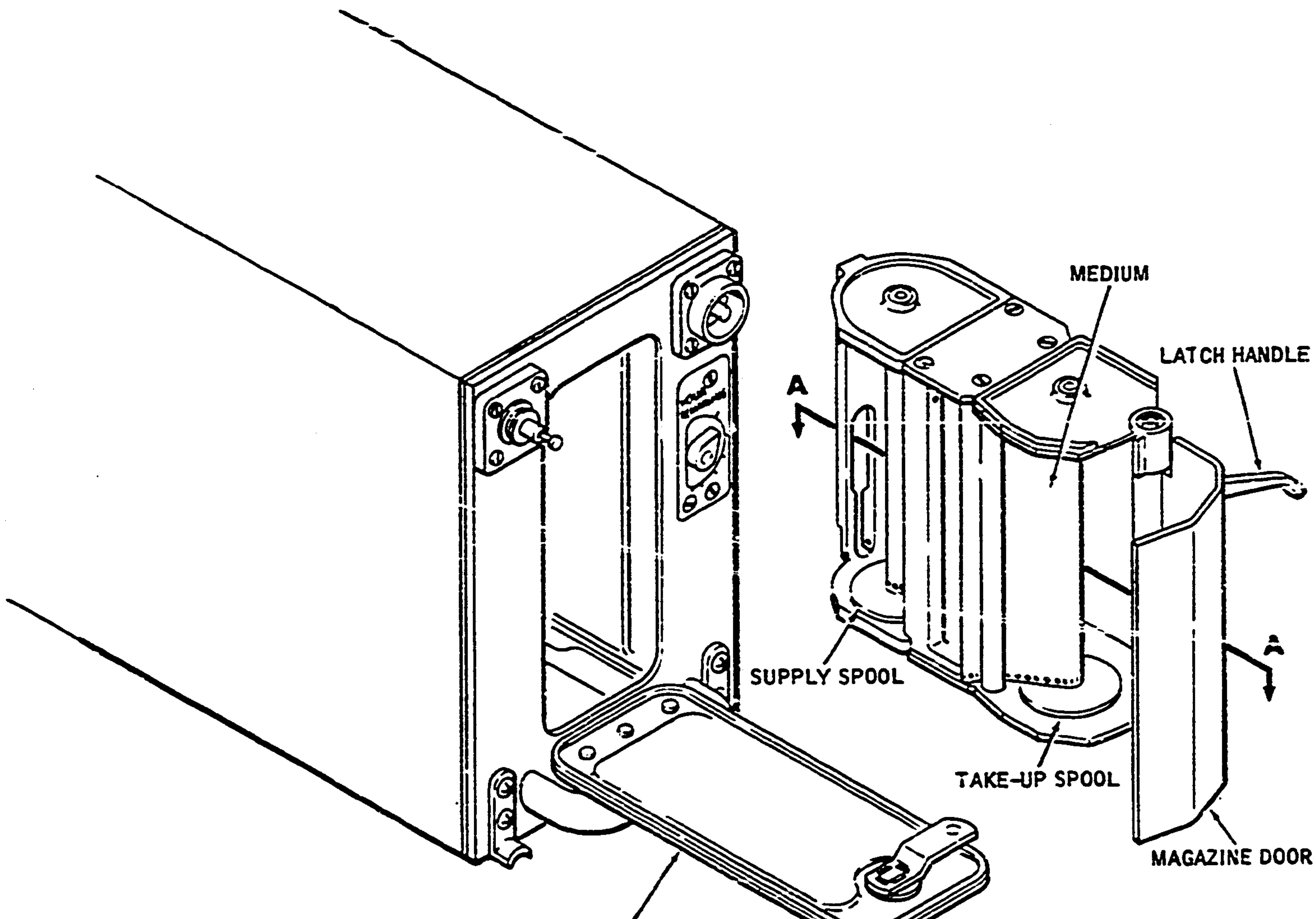
B. Install Recording Medium

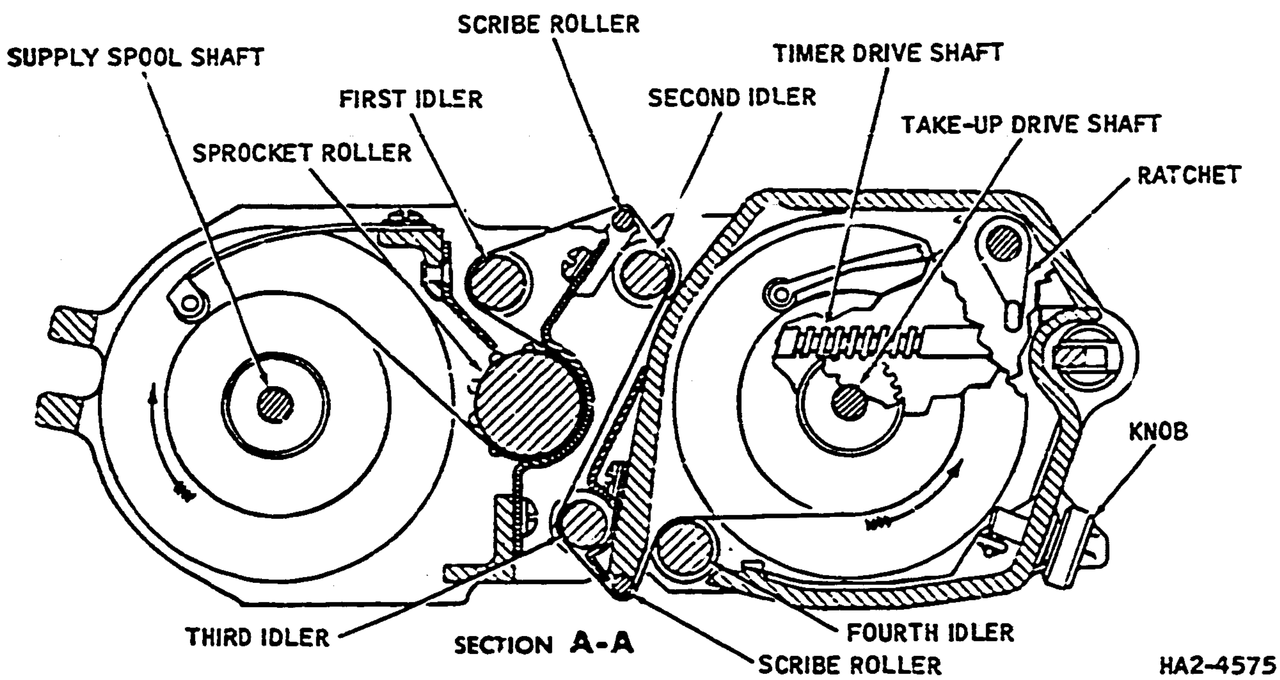
(1) Install gears on sprocket roller and takeup drive shaft.

(2) Position spool of medium in magazine with tapered hole in end facing left.

CAUTION: USE EXTREME CARE WHEN INSTALLING SHAFT TO PREVENT DAMAGE TO BEARING.

(3) Install supply spool shaft through spool of medium until gear engages the timer drive shaft.





Flight Recorder Medium Replacement
Figure 301

(4) Hand rotate shaft clockwise until left end engages hex slot of drag plate.

(5) Pull out and expose approximately six inches of medium.

(6) Feed medium around sprocket roller to engage at least two pins. Continue to rotate until medium is wrapped around half sprocket roller.

(7) Position magazine on end opposite gears and continue to rotate gear clockwise until medium comes through approximately six inches on near side of first idler roller.

(8) Trim corners and feed medium around scribe roller, then around far side of second idler roller. Continue to opposite side of magazine around third idler roller.

(9) Reposition magazine to step 1 position.

(10) Rotate sprocket roller clockwise and feed medium between second scribe roller and fourth idler roller until six inches of medium extends beyond the roller.

(11) Secure medium with cellophane tape to spool with tapered hole in end facing left.

(12) Turn medium spool approximately two turns loosely winding slack medium onto spool.

CAUTION: USE EXTREME CARE WHEN INSTALLING THE SHAFT TO PREVENT BEARING DAMAGE.

(13) Position spool in magazine and insert takeup drive shaft until threads engage timer drive shaft.

(14) Rotate shaft clockwise until shaft engages bearing. Disengage ratchet and complete tightening shaft.

(15) Release ratchet; engage shaft and gear then continue to rotate shaft until all slack on medium is taken up.

(16) Turn shaft six more revolutions and observe alignment of spool and sprocket holes.

(17) Rotate knob clockwise and gently close door.

(18) Install magazine in flight recorder and secure with latch lever.

(19) Close front panel door.

(20) Close flight recorder circuit breakers and remove warning signs.

FLIGHT RECORDER - SERVICING

1. General

   A. The flight recorder is located on shelf five of radio rack. Servicing the flight recorder consists of replacing the medium.

2. Servicing Flight Recorder

   A. Remove Recording Medium

      (1) Open flight recorder circuit breakers located on main circuit breaker panel.

      WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

      (2) Open front door panel.

      (3) Lift latch handle and remove magazine from flight recorder.

      (4) Position magazine with knob up and gears on shafts facing right.

      (5) Press in extractor and open magazine door.

      (6) Wind any remaining medium onto spool by rotating spool clockwise.

      (7) Unscrew supply spool shaft and remove from magazine.

      (8) Depress pawl and unscrew takeup shaft; remove shaft spool.

      (9) Remove spool from magazine.

      (10) Tape end of medium to prevent unwinding and identify spool with pertinent information.

   B. Install Recording Medium

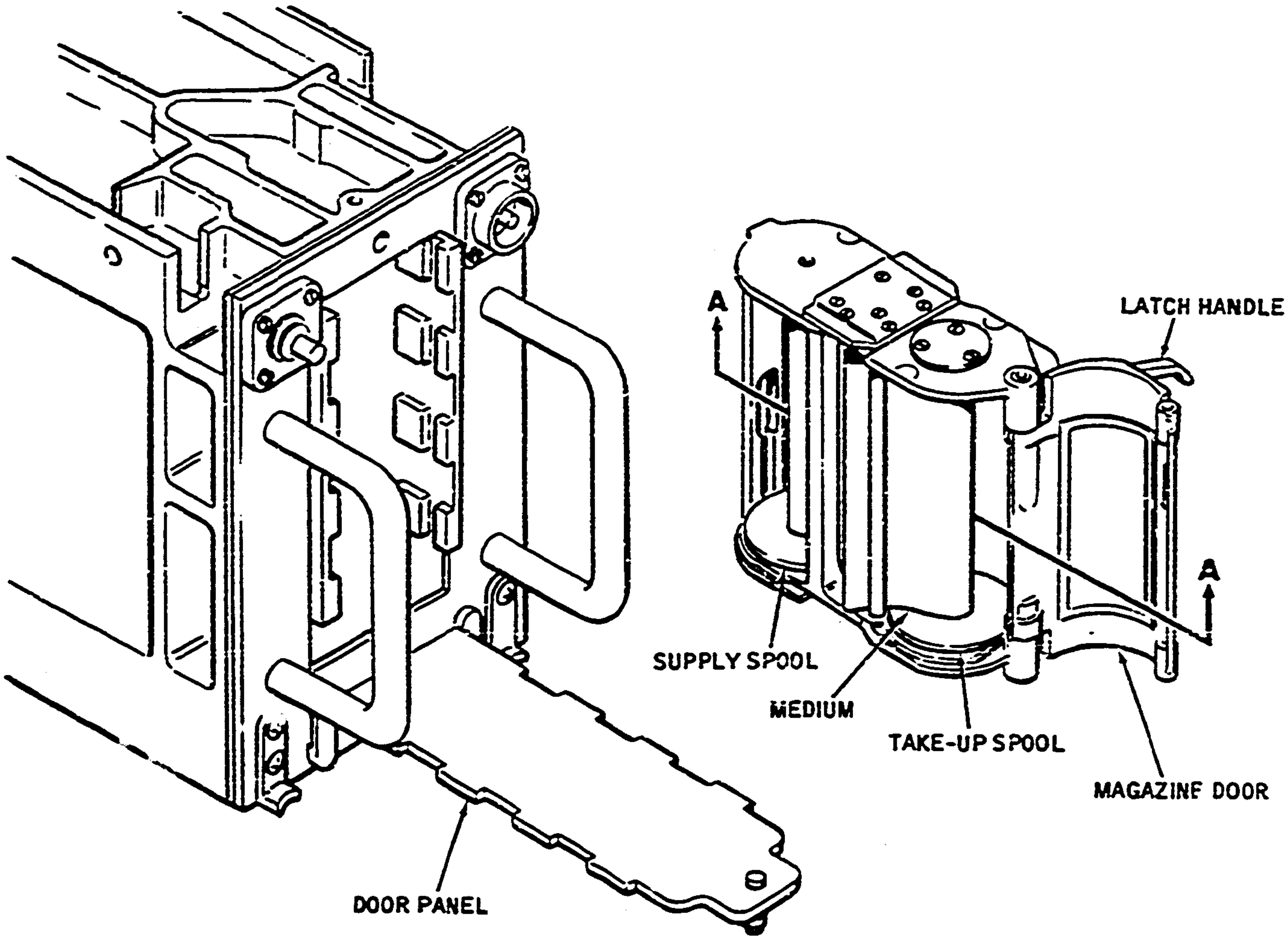
      (1) Position spool of medium in magazine.

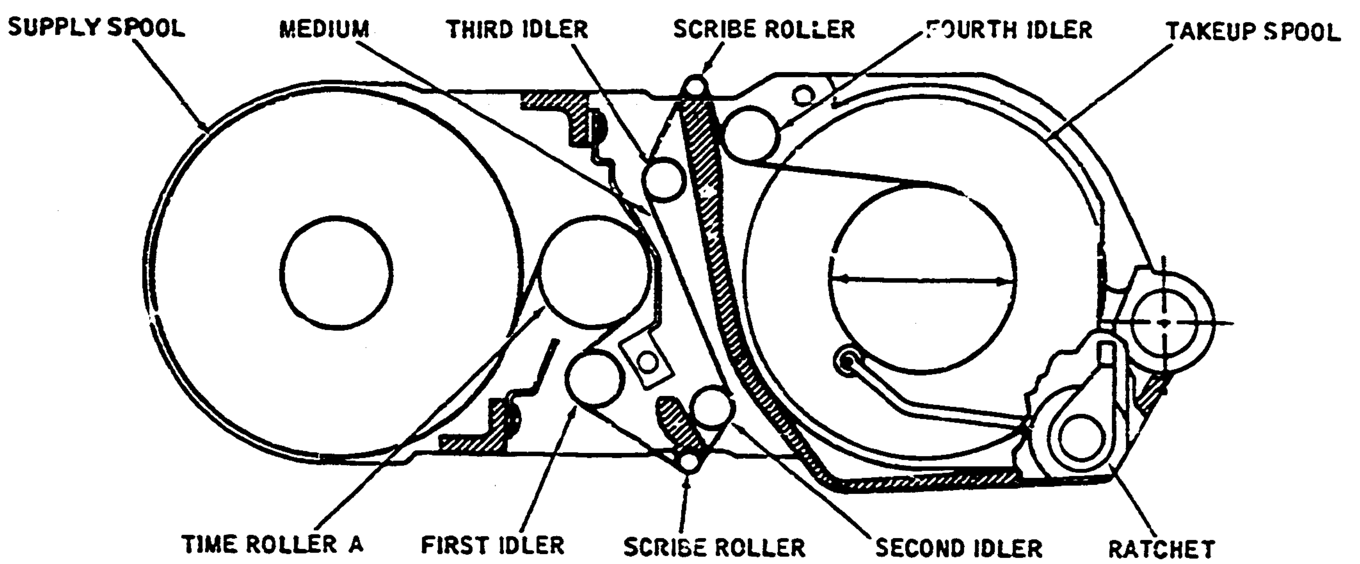
      WARNING: HANDLE MEDIUM WITH CARE TO AVOID INJURY TO HANDS.

      (2) Install supply spool shaft through spool of medium until flats engage spring locks.

      (3) Hand rotate shaft clockwise until secured in magazine.

      (4) Pull out and expose approximately 12 inches of medium.





SECTION A-A

HA2-5040

Flight Recorder Medium Replacement
Figur 301

(5) Feed medium around sprocket roller to engage at least two pins. Continue to rotate until medium is wrapped around half of sprocket roller.

(6) Position magazine on end opposite gears and continue to rotate gear clockwise until medium comes through approximately six inches on near side of first idler roller.

(7) Trim corners and feed medium around scribe, then around far side of second idler roller. Continue to opposite side of magazine and around third idler roller.

(8) Reposition magazine with gear facing upward.

(9) Rotate sprocket roller clockwise and feed medium around scribe roller and fourth idler roller until six inches of medium extends beyond roller.

NOTE: The medium feeds under the fourth idler roller.

(10) Insert medium into slot in takeup spool and secure with tape.

(11) Turn medium spool approximately two turns loosely winding loose medium onto spool.

CAUTION: VERIFY THAT THE SPROCKET PROPERLY ENGAGES THE MEDIUM WITHOUT ANY DISTORTION TO THE HOLES IN MEDIUM.

(12) Position spool in magazine and insert takeup drive shaft until pawl engages timer gear assembly.

(13) Turn shaft six more turns and observe alignment of spool and sprocket holes.

(14) Close magazine door.

(15) Install magazine in flight recorder and secure with latch lever.

(16) Close front door panel and lock by pressing downward and engaging pin in recorder frame.

(17) Close flight recorder circuit breakers and remove warning signs.

FLIGHT RECORDER - REMOVAL AND INSTALLATION

1. General

   A. The flight recorder is located in the aft pressurized cabin above the drop ceiling.

2. Removal/Installation Flight Recorder

   A. Remove flight recorder.

      (1) Open flight recorder circuit breaker located on right ac and right dc emergency bus section of upper circuit breaker panel.

      WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

      (2) Gain access through rear ceiling access door.

      (3) Remove pitot and static lines from front of flight recorder.

      (4) Loosen and disengage knurled nuts from mounting brackets on lower front of panel of unit.

      (5) Pull recorder unit inboard and out of mount.

   B. Install flight recorder unit.

      (1) Make certain flight recorder circuit breaker located on right ac and right dc emergency bus section of upper circuit breaker panel is open, tagged, and safetied.

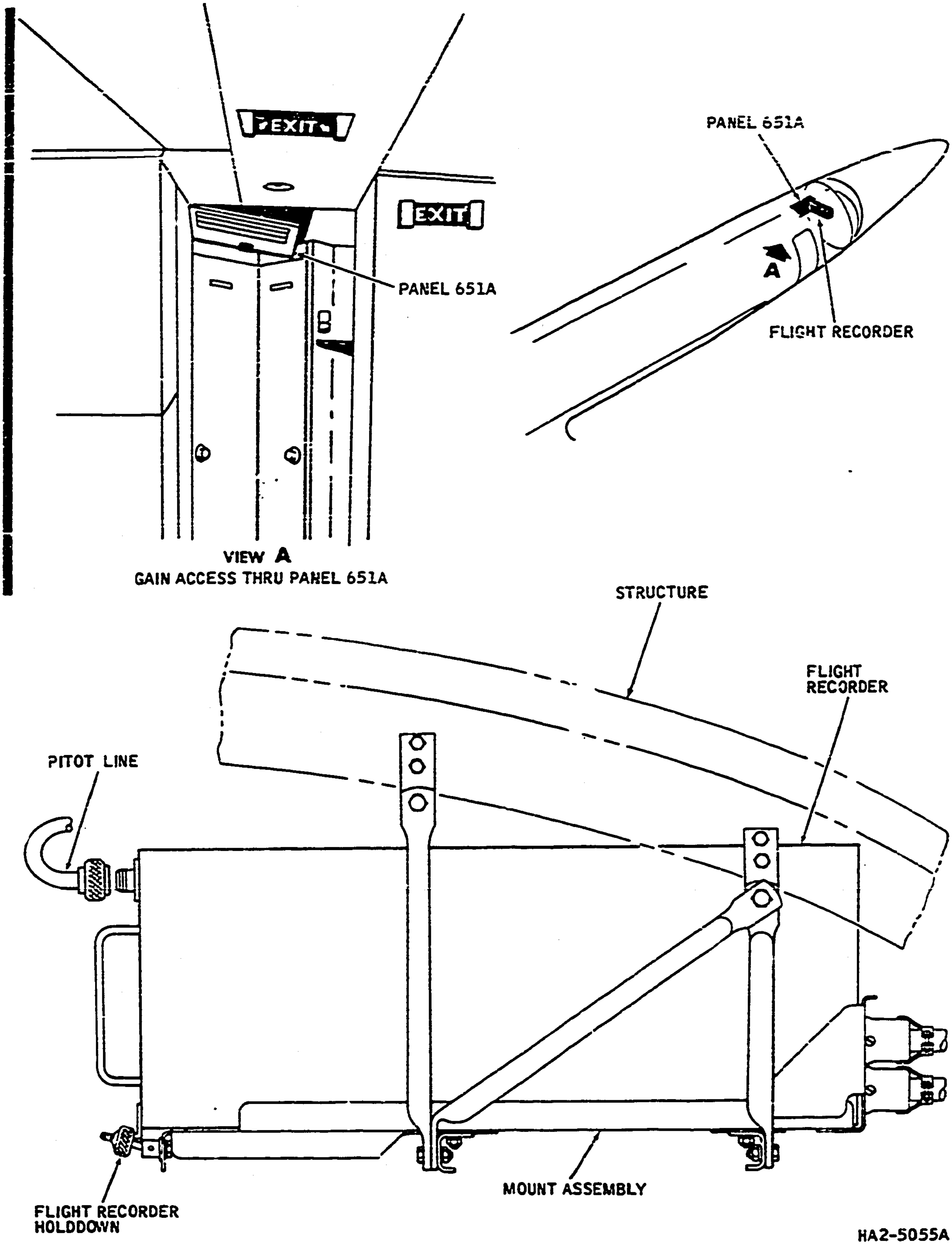
      (2) Install recorder unit on mount.

      (3) Engage and tighten knurled nuts on mounting bracket on lower front panel of unit.

      (4) Connect pitot and static lines to the front of the flight recorder.

      (5) Close flight recorder circuit breakers.

      (6) Operate flight recorder (see 31-22-0).



Flight Recorder -- Removal/Installation
Figure 401

FLIGHT RECORDER - REMOVAL AND INSTALLATION

1. General

   A. The flight recorder is located on a mount in the tail compartment.

2. Removal/Installation Flight Recorder

   A. Remove flight recorder.

      1) Open flight recorder circuit breaker located on right ac emergency bus section of upper circuit breaker panel.

         WARNING: TAG AND SAFETY CIRCUIT BREAKER.

      (2) Gain access through tail stowage compartment door.

      (3) Remove pitot and static lines and electrical connectors from flight recorder.

      (4) Remove capscrews securing flight recorder to mount.

      (5) Lift recorder unit off mount.

   B. Install flight recorder unit.

      (1) Make certain flight recorder circuit breaker located on right ac emergency bus section of upper circuit breaker panel is open, tagged, and safetied.

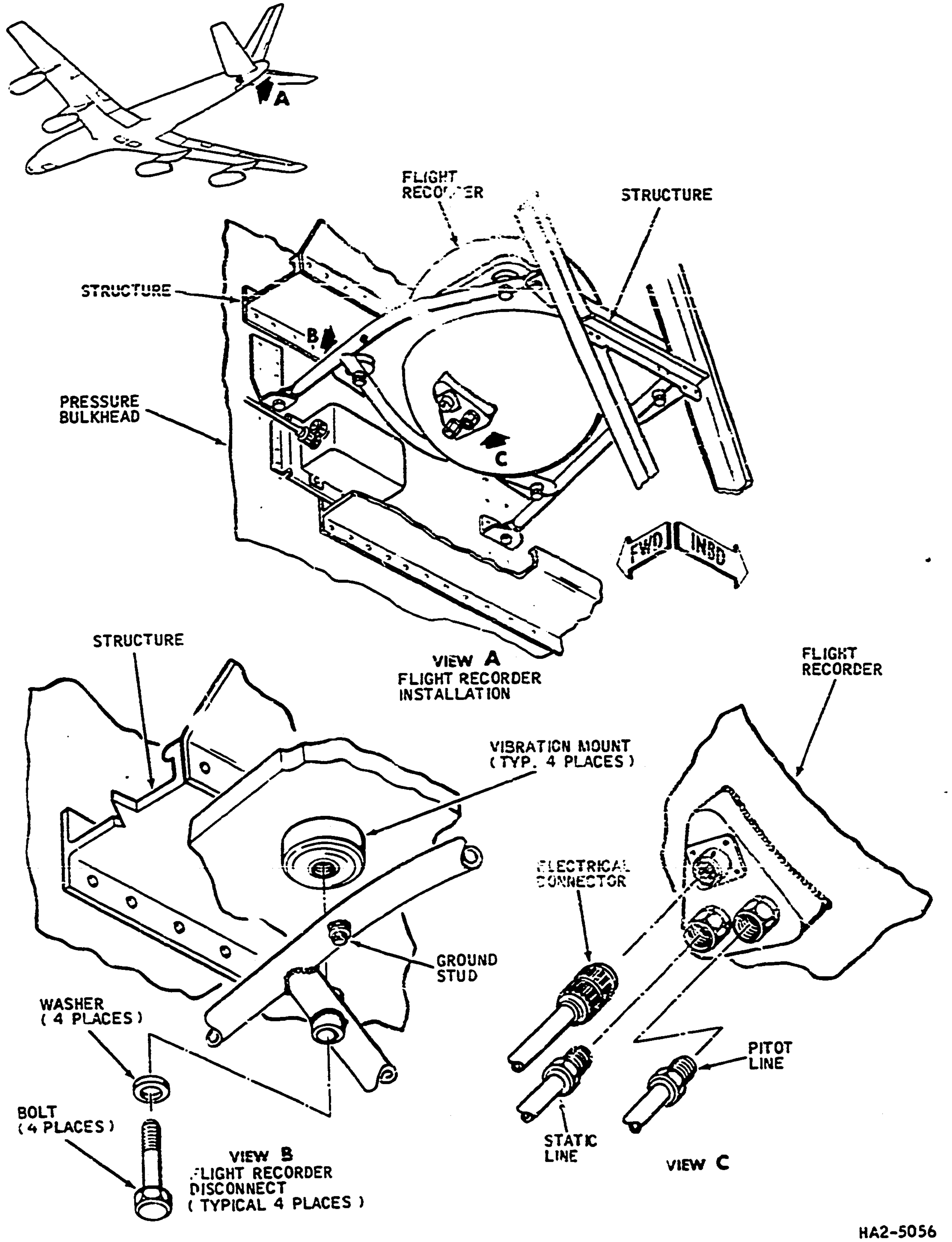
      (2) Install recorder unit on mount.

      (3) Position and secure flight recorder on mount with capscrews.

      (4) Connect pitot and static lines and electrical connector to the flight recorder.

      (5) Close flight recorder circuit breakers.

      (6) Operate flight recorder (see 31-22-0).



Flight Recorder -- Removal/Installation
Figure 401

FLIGHT RECORDER - REMOVAL AND INSTALLATION

1. General

A. The flight recorder is mounted on pilot's radio rack.

2. Removal/Installation Flight Recorder

A. Remove flight recorder.

(1) Open flight recorder circuit breaker located on right ac and right dc emergency bus section of upper circuit breaker panel.

WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

(2) Gain access to radio rack.

(3) Remove pitot and static lines from front of flight recorder.

(4) Loosen and disengage knurled nuts from mounting brackets on lower front of panel of unit.

(5) Pull recorder unit inboard and out of mount.

B. Install flight recorder unit.

(1) Make certain flight recorder circuit breaker located on right ac and right dc emergency bus section of upper circuit breaker panel is open, tagged, and safetied.

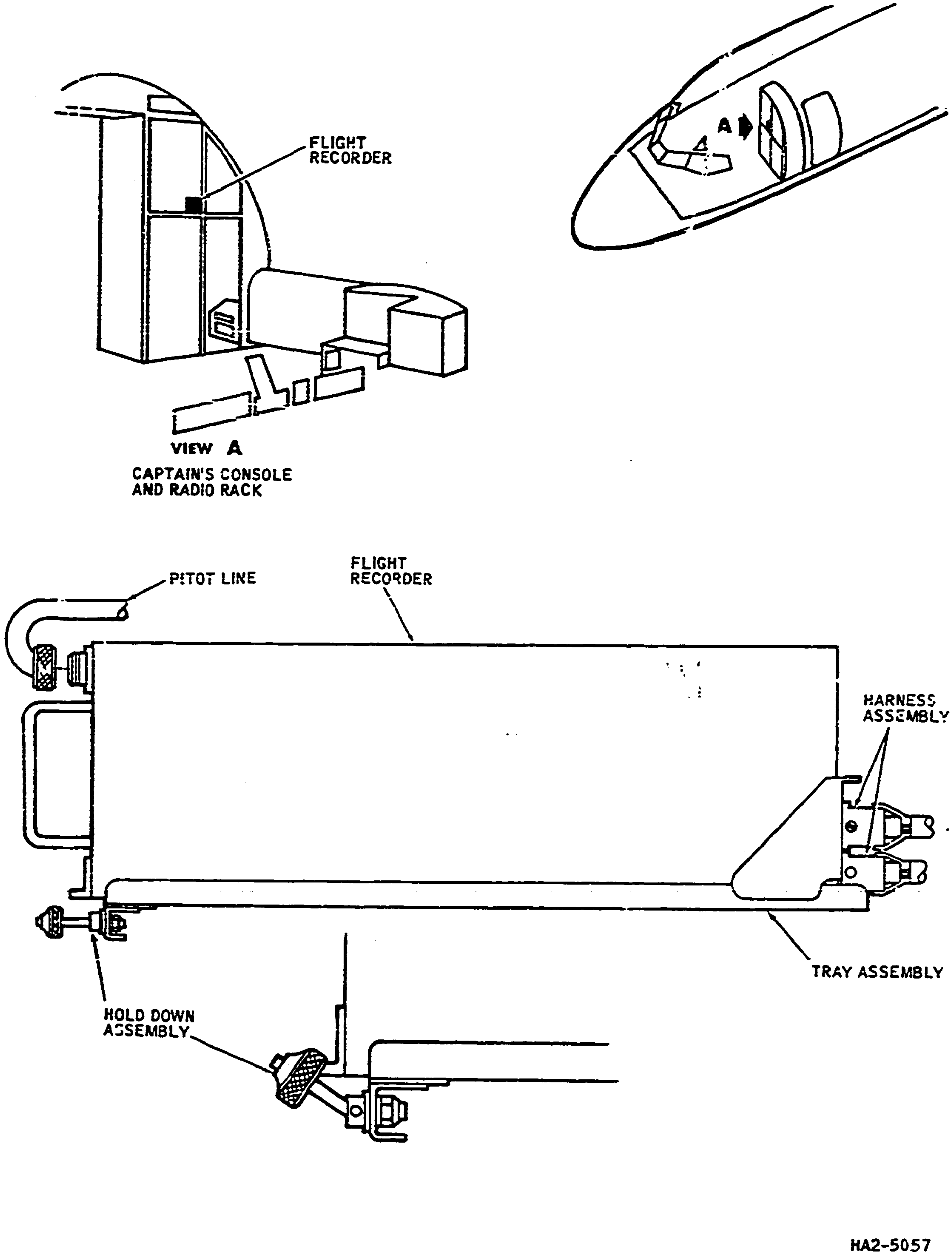
(2) Install recorder unit on mount.

(3) Engage and tighten knurled nuts on mounting bracket on lower front panel of unit.

(4) Connect pitot and static lines to the front of flight recorder.

(5) Close flight recorder circuit breakers.

(6) Operate flight recorder (see 31-22-0).



Flight Recorder -- Removal/Installation
Figure 401

FLIGHT RECORDER - REMOVAL AND INSTALLATION

1. General

   A. The flight recorder is mounted on a shelf in the left stowage compartment.

2. Removal/Installation Flight Recorder

   A. Remove flight recorder.

      (1) Open flight recorder circuit breaker located on left ac and left dc emergency bus section of upper circuit breaker panel.

      WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

      (2) Open stowage door.

      (3) Remove pitot and static lines from front of flight recorder.

      (4) Loosen and disengage knurled nuts from mounting brackets on lower front of panel of unit.

      (5) Pull recorder unit inboard and out of mount.

   B. Install flight recorder unit.

      (1) Make certain circuit breaker called out in Step A.(1) is open; tagged, and safetied.

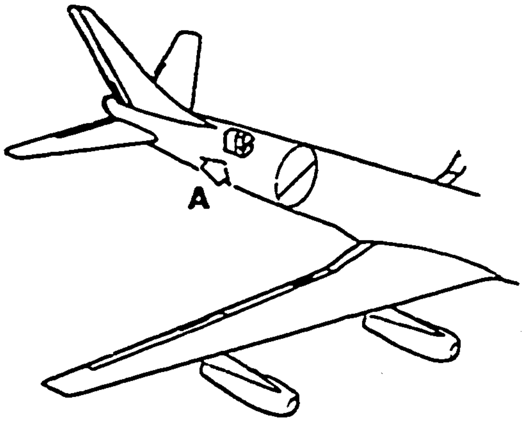
      (2) Install recorder unit on mount.

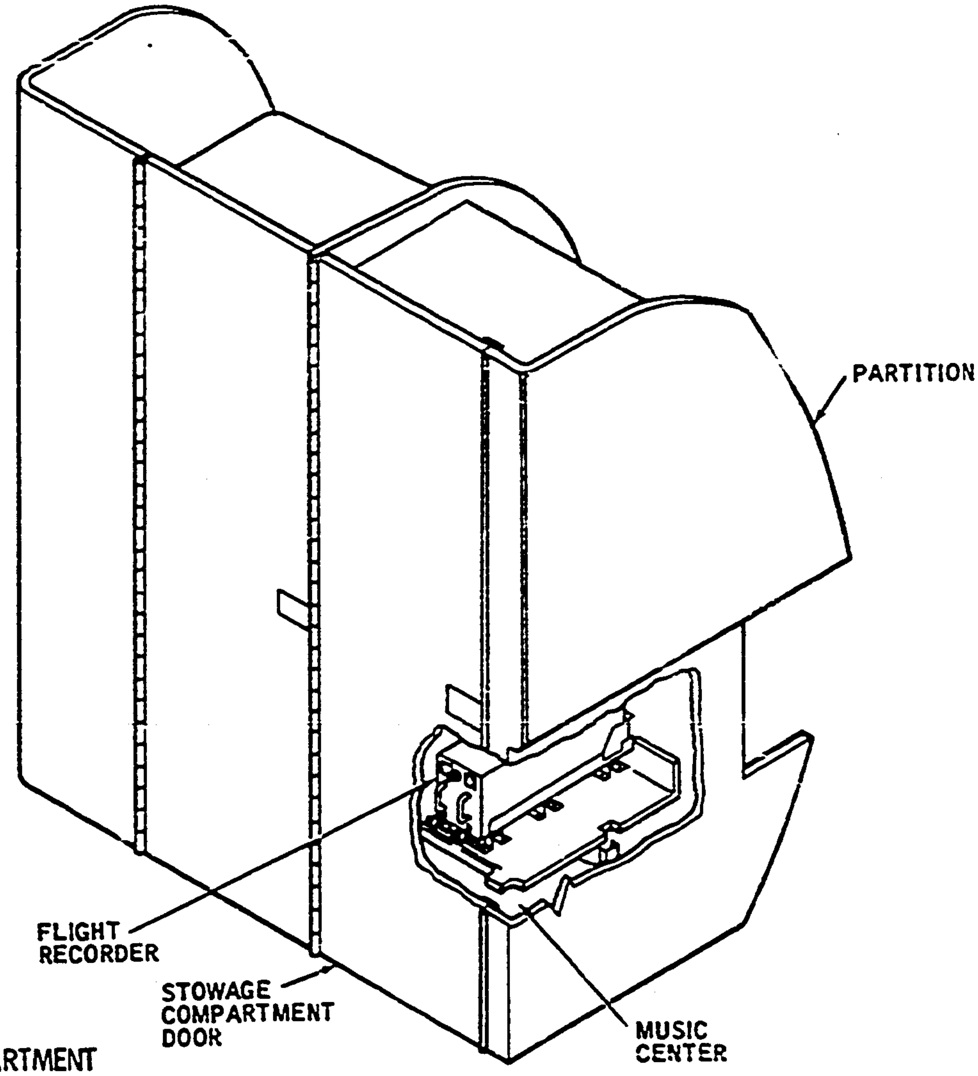
      (3) Engage and tighten knurled nuts on mounting bracket on lower front panel of unit.

      (4) Connect pitot and static lines to the front of the flight recorder.

      (5) Close circuit breakers which were opened in Step A.(1).

      (6) Operate flight recorder. (See 31-22-0).





AFT STOWAGE COMPARTMENT
LEFT SIDE

VIEW A

HA2-5779

Flight Recorder, Removal and Installation
Figure 1

FLIGHT RECORDER - REMOVAL AND INSTALLATION

1. General

   A. The flight recorder is located on the aft bulkhead above the drop ceiling.

2. Removal/Installation Flight Recorder

   A. Remove flight recorder.

      (1) Open flight recorder circuit breaker located on left ac and left dc emergency bus section of upper circuit breaker panel.

      WARNING: TAG AND SAFETY CIRCUIT BREAKERS.

      (2) Gain access through rear ceiling access door.

      (3) Remove electrical connections from front of flight recorder.

      (4) Loosen and disengage knurled nuts from mounting brackets on lower front of panel of unit.

      (5) Pull recorder unit inboard and out of mount.

   B. Install flight recorder unit.

      (1) Make certain flight recorder circuit breaker located on left ac and left dc emergency bus section of upper circuit breaker panel is open, tagged, and safetied.

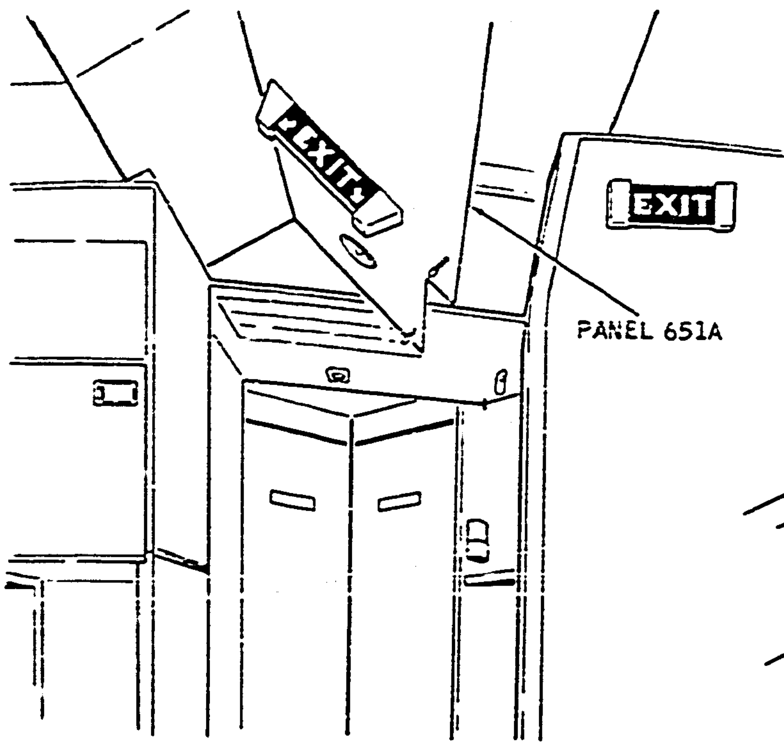
      (2) Install recorder unit on mount.

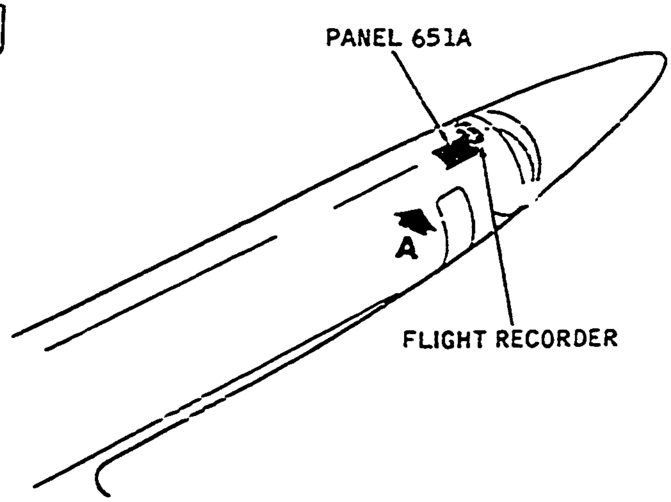
      (3) Engage and tighten knurled nuts on mounting bracket on lower front panel of unit

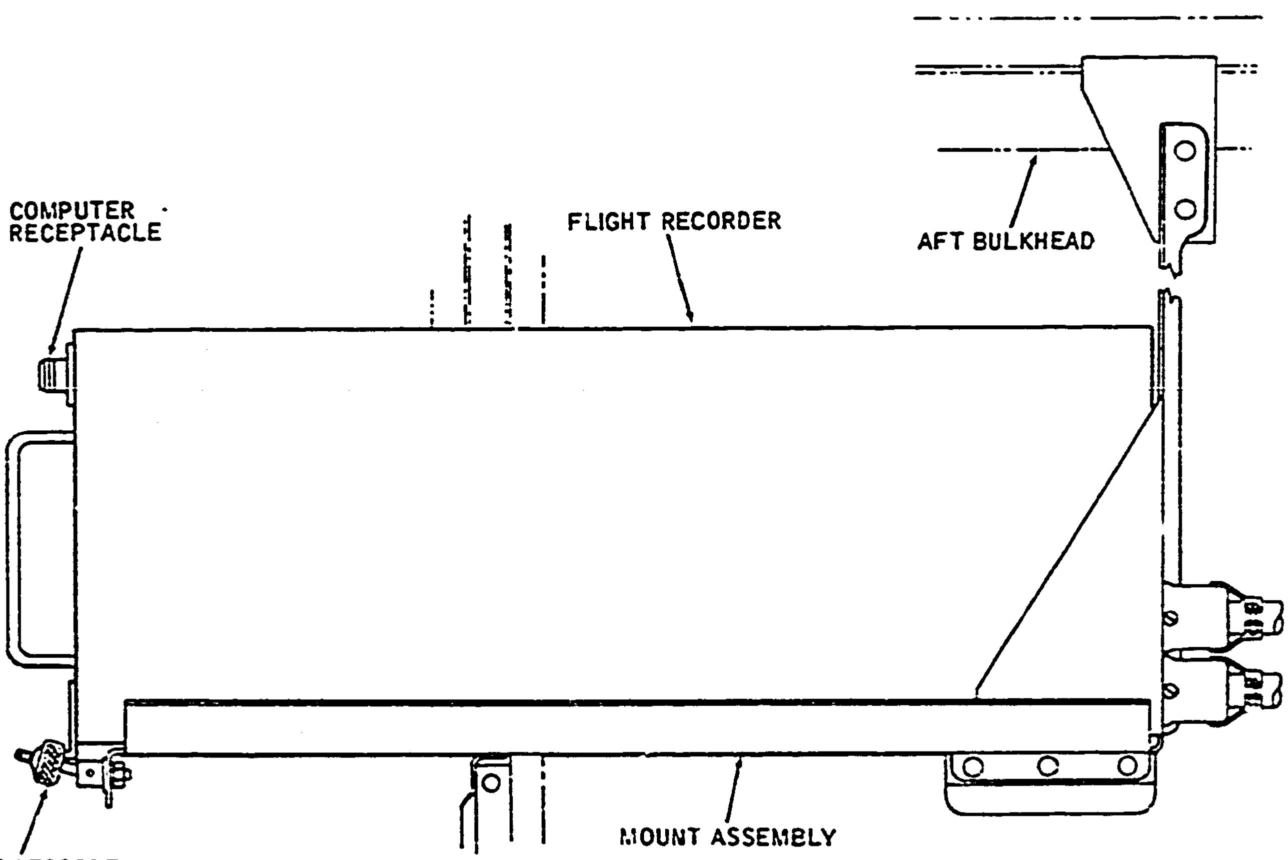
      (4) Connect electrical connections to the front of the flight recorder.

      (5) Close flight recorder circuit breakers.

      (6) Operate flight recorder (see 31-22-0).







Flight Recorder -- Removal/Installation
Figure 401